BEHIND THE SEARCH BOX: THE POLITICAL ECONOMY OF A GLOBAL INTERNET INDUSTRY

BY

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DISSERTATION

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Abstract

With the rapid proliferation of the Web, the search engine constituted an increasingly vital tool in everyday life, and offered technical capabilities that might have lent themselves under different circumstances to a sweeping democratization of information provision and access. Instead the search function was transformed into the most profitable large-scale global information industry.

This dissertation examines the evolution of search engine technologies within the context of the commercialization and commodification of the Internet. Grounded in critical political economy, the research details how capital has progressively shifted information search activities further into the market, transforming them into sites of profit-making and poles of capitalist growth. It applies historical and political economic analysis by resorting to an extensive array of sources including trade journals, government documents, industry reports, and financial and business newspapers.

The first chapter situates the development of the search engine within the wider political economy of the Internet industry. The second shows how the technology of search was reorganized to enable profitable accumulation. The third and fourth chapters focus on another primary concern of political economy: the labor structures and labor processes that typify this emergent industry. These pivot around familiar compulsions: profit-maximization and management control. The search industry is famous for the almost incredible perks it affords to a select group of highly paid, highly skilled engineers and managers. However, the same industry also relies not only a large number of low-wage workers but also an unprecedented mass of unwaged labor. Google and other search engines also have found means of re-constructing the practices of a seemingly bygone industrial era of labor control: corporate paternalism and

scientific management.

Today, the search engine industry sits at the "magnetic north pole" of economic growth – the Internet. This vital function of search is controlled disproportionately by US digital capital, mainly Google. US dominance in search seems to carry forward the existing, deeply unbalanced, international information order; however, this US-led industry actually faces jarring oppositions within a changing and conflicted global political economy. Chapter Five investigates two of the most important and contested zones: China, whose economic growth has been unsurpassed throughout the entire period spanned by this study of the search engine's development, and which has nurtured a highly successful domestic Internet industry, including a search engine company, Baidu; and Europe, US's long-time ally, where units of capital both European and non-European are struggling with one another. By situating search within these contexts, this chapter sheds light on the ongoing reconfiguration of international information services, and on the geopolitical-economic conflicts that are altering the dynamics of information-intensive transnational capitalism.

There is a well-developed critical scholarship in political economy that foregrounds the role of information in contemporary capitalist development. This dissertation contributes to and expands this research by looking at search to uncover the capital logics that undergird and shape contemporary information provision.

To my parents and James

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Introduction

"New" Digital Economy

In announcing that 2.5 million jobs were lost to the global economic crisis in 2008, President Obama vowed to renew the "information highway" in order to create jobs and strengthen America's "competitiveness" in the world.[1] This was followed by his visit to Silicon Valley – the epicenter of the "new" economy – to meet with high tech industry CEOs including the late Steve Jobs from Apple, Facebook's Mark Zuckerberg, Oracle's Larry Ellison, Google's Eric Schmidt, Yahoo's Carol Bartz, Cisco Systems' John Chambers, Twitter's Dick Costolo, and Netflix's Reed Hastings.[2]

Obama's visit to Silicon Valley was not merely to express his gratitude toward the tech giants which were the largest of his presidential campaign contributors, but was also to discuss the "partnership" between the public and private sectors to reboot the process of capital accumulation[3] through the Internet sector in order to shore up the depressed capitalist economic system. The search engine industry lies at the center of this larger effort.

The Internet sector is a strategic growth industry, which has been refueled by fresh capital to jolt the capitalist economy. In the midst of one of the worst global economic crises, when millions of people were losing jobs, homes, pensions, and social welfare rights around the world, the Obama Administration – as part of its stimulus

[1] David Rochelson, "President-elect Barack Obama lays out key parts of Economic Recovery Plan," The Office of the President-Elect, December 6, 2008, http://change.gov/newsroom/entry/the_key_parts_of_the_jobs_plan/.
[2] Lance Whitney, "Obama dines with Jobs, Zuckerberg, other tech honchos," *CNET*, February 18, 2011, http://www.cnet.com/news/obama-dines-with-jobs-zuckerberg-other-tech-honchos/.
[3] Marxist theory defines accumulation as the process of converting surplus value into production in order to generate more surplus.

package in 2009 – funneled billions of dollars to incorporate and expand new Internet-based technologies into medicine, education, energy, transportation, federal IT infrastructure, and manufacturing industries in order to extend and open up vast new information businesses for capital with the promise of economic recovery, prosperity, creation of quality jobs, transparency, and a more democratic society.[4]

Under the stimulus, the administration orchestrated a series of "public and private" initiatives to enlarge the Internet sector – including a project called *Digital Promise* backed by the Department of Education, academia and the tech industry to create "smart demand" to move the education system further toward being an appendage of the market;[5] electronic medical records being mandated by the federal government to open up a new billion dollar health IT market;[6] promoting a smart grid by the Department of Energy for trade and investment around the world; and, all in the name of transparency, the White House pushed its open data policy, requiring government agencies to release government data and in effect turning over valuable government data like weather, climate, health, and geographic data collected at tax payer expense to the information market.

The US has been aggressively reorienting its domestic economy to aid digital capital enlarging in restructuring the Internet as a transnational economic platform. The Obama Administration has placed an unprecedented emphasis on "digital trade" – commerce over the Internet – and mobilized major government agencies including the

[4] Office of the President of the United States, "Issues: Technology," http://www.whitehouse.gov/issues/technology.
[5] The White House Office of the Press Secretary, "White House to Launch Digital Promise Initiative," September 16, 2011, http://www.whitehouse.gov/the-press-office/2011/09/16/white-house-launch-digital-promise-initiative.
[6] Nicole Freeman, "Electronic medical records market to expand by 2017," February 6, 2014, http://ehrintelligence.com/2014/02/06/electronic-medical-records-market-to-expand-by-2017/.

Department of State, Department of Commerce, and International Trade Commission in order to remove a range of obstacles for US digital capital to reach global markets over the Internet. The US search engine industry is playing a leading role in organizing the Internet as an economic growth zone and in expanding digital capital across industries and geographical territories.

The search engine has evolved beyond the simple information retrieval system, positioning itself strategically within the complex and dynamic territory of the Internet. And Google is the globally dominant force within search. As journalist Ken Auletta has stated, search engine giant Google "encroaches on every media industry from telephone to television to advertising to newspapers to magazine to book publishers to Hollywood studios to digital companies like Microsoft, Amazon, and Apple."[7] As Google weaves itself inexorably into the Internet "ecosystem," the company is playing a significant role in reconfiguring the existing information industry as a whole, and at the same time affecting the setting of a wide range of technical standards and information policies surrounding the Internet: search algorithms, e-books, intellectual property, privacy, net neutrality, broadband, wireless, labor policy and beyond.

Google alone generated almost $60 billion in revenue in 2013, with over 90% of its revenue from online advertising. If Google were compared to a country, based on its revenue, it would rank 71st in the world in terms of GDP – ahead of countries such as Uruguay and Costa Rica. Google operates in more than 115 countries, and offers its services in more than 114 languages, while Yahoo! and Bing operate in 35 countries.

[7] Ken Auletta, *Googled: The End of the World As We Know it* (New York: Penguin Press, 2009), xii.

Google accounts for nearly 25 percent of Internet traffic in North America – bigger than Facebook, Netflix and Twitter combined.[8]

While Google's market share in the US hovers around 66%, its market share in many big European markets and Latin America is over 90%. As of 2013, 58% of Google's revenue comes from the international market.[9] Google controls over 33% of global online ad revenues, and combined, Google, Bing, Yahoo!, AOL and Facebook control 68% of global online marketing while Google, Bing and Yahoo! control almost 72% of the global desktop search market. Google takes half of all global mobile Internet ads revenue.[10] According to a 2011 report by the management consulting firm McKinsey & Company, global search activity reached an annual value of $780 billion in 2009 – equivalent to the GDP of the Netherlands or Turkey.[11] This number actually is considered a relatively conservative estimate given that the research only looked at nine sources of value for 11 constituencies in five countries.[12] While this kind of research does not offer an accurate accounting, it provides some idea of the actual size of the industry. Not only have search engines become multi-billion dollar global businesses, but they are actually changing our social and cultural practices. And this new, immensely lucrative information market is dominated by US-based search engines Google, Bing, and Yahoo!.

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[8] Chris Boyette, "Google makes up 25% of Internet Traffic," *CNN*, July 23, 2013, http://money.cnn.com/2013/07/23/technology/google-internet/index.html.
[9] "Google's 2014 income statement information," https://investor.google.com/financial/tables.html.
[10] "Google Takes Home Half of Worldwide Mobile Internet Ad Revenues," *eMarketer*, June 13, 2013, http://www.emarketer.com/Article/Google-Takes-Home-Half-of-Worldwide-Mobile-Internet-Ad-Revenues/1009966.
[11] Jacques Bughin and Laura Corb, "The Impact of Internet Technologies: Search," *McKinsey & Company*, July 2011, http://www.paleycenter.org/assets/international-council/IC-2011-LA/Mobile-App/2011-08-18-Impact-of-Internet-technologies-Search.pdf.
[12] The nine sources of search value are included in the research are: better matching, time saved, Raised awareness, price transparency, long tail offering, people matching, problem solving, new business models, and entertainment. Constituencies include advertisers, retailers, entrepreneurs, content creators, enterprise, consumers, individual content creators, individual information seekers, health care, education and government.

This new wave of US information industry is expanding its business profile around the globe. The US search engine industry, and in particular Google, has transformed the search function on the Internet into an ever more powerful extraterritorial information system and information infrastructure, and has deepened the information market on a transnational scale. However, this US-centered system is heavily contested and resisted by social and political forces as it collides with other states and rival units of capital. As Dan Schiller puts it, the construction of extraterritorial information networks is pivotal in expansion of capital and capitalist economy, but its processes are complex and conflicted given that they are involved with various interests of stakeholders – geopolitical rivals, domestic and foreign capital, corporate users and other social and political actors.[13]

Thus, behind the seemingly clean and simple interface of the search box, there is an immense and swiftly changing political economy of information provision; however, there is little scrutiny on how the global search engine industry is organized, structured, and under what principles it operates across territories. This emergence of transnational search engine services cannot simply be explained by reference to a natural technological progression.

Given this context, this dissertation draws from the tradition of Critical Political Economy of Information (PEI) and attempts to offer a full political economy of search, to uncover important ongoing structural changes within a rapidly evolving system of information provision. To that end, critical questions demand scrutiny: how did the search engine – which interacts with a basic human activity – evolve into an ubiquitous commercial service and a key component of today's "new economy," a dynamic global

[13] Dan Schiller, "Geopolitical-economic conflict and network infrastructures," *Chinese Journal of Communication* 1, no.1 (2011): 90.

information business that is in the process of restructuring both the wider information industry and our very social lives? How has this occurred? How is search technology being used and designed, for what purposes, by whom and for what? Who is actually laboring behind this enormously profitable information industry? Can the US continue to hold its supremacy over this newfound economic growth zone?

To engage these fundamental questions, the project provides a systematic critical analysis of the political economy of the global search industry, specifically, commodification, commercialization, technical infrastructure, labor and geopolitical aspects of information in order to understand capital logics, accumulation strategies, and various social and political actors, and their relationships to each other in the development and expansion of global search engine industry. Specifically by looking at the search engine industry in the United States, the People's Republic of China (PRC), and the European Union – global political economic power centers – this dissertation attempts to reveal characteristics of social, and political struggles around the new economic growth zone of search and their relationship to the changing dynamic of US-led transnational capitalism.

Literature Review

As the search engine has become the major gateway to information, there has been a growing interest among scholars from a range of fields beginning to recognize the implications of its social, political and technical functions. A number of scholars rightly question and refute the popular belief of the search engine as a neutral medium or a new democratizing alternative medium providing diverse voices.[14] Rather, they point out that

[14] Matthew Hindman, *The Myth of Digital Democracy* (Princeton: Princeton University Press, 2009); Lucas Introna, and Helen Nissenbaum, "Shaping the Web: Why the Politics of Search

search engines often reinforce dominant cultures and social hierarchies. These critiques are useful in drawing attention to the growing power of the search engine, and how it functions in and has consequences on our social, cultural and political lives.

However, there has been little scholarship that directly addresses the political economy of search, though there are many journalistic accounts of the search engine industry.[15] The exception is Elizabeth Van Couvering, who offers the first political economy of the search industry, locating the industry within the larger media and communication industry and identifying a search industry that sells Web traffic rather than access to audience attention as traditional media industry does.[16] She examines the history, ownership structure and the development of business models of the search engine industry. Her analysis extends to four different countries: China, Japan, Germany, and South Africa, and illustrates the dominance of US-based search companies worldwide as well as the existence of local companies – particularly in China – countering this US-based dominance. Tim Wu's *Master Switch* focuses on the US side of the equation, and more specifically on Google, and argues that information industries tend to go through open and closed restructuring cycles; so, according to Wu, the current dominance of

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Engines Matter," *The Information Society* 16, no. 3 (2000): 169 –185; Eszter Hargittai, " Do You 'Google'? Understanding Search Engine Use Beyond the Hype," *First Monday* 9, no. 3 (2003), http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1127/1047; Alexander Halavais, *Search Engine Society* (Cambridge: Polity, 2009); Siva Vaidhyanathan, *The Googlization of Everything: (and Why We Should Worry)* (Berkeley: University of California Press, 2011).

[15] Auletta, *Googled*; John Battelle, *The Search: How Google and Its Rivals Rewrote the Rules of Business and Transformed Our Culture* (New York: Portfolio, 2005); Jeff Jarvis, *What Would Google Do?* (New York: Collins Business, 2009); Steven Levy, *In the Plex: How Google Thinks, Works, and Shapes Our Lives* (New York: Simon & Schuster, 2011).

[16] Elizabeth Van Couvering, "Navigational Media: The Political Economy of Online Traffic" in *The Political Economy of Media*, ed. Dwayne Winseck & Dal Yong Jin (London: Bloomsbury Academic, 2011): 183-200; Elizabeth Van Couvering, "Search engine bias: the structuration of traffic on the World-Wide Web" (PhD diss., London School of Economics, 2010); Elizabeth Van Couvering, "New media? The Political Economy of Internet Search Engines" (paper presented at *Annual Conference of the International Association of Media & Communications Researcher*s, Porto Alegre, Brazil, 2004).

Google (closed) is not permanent but part of the recurring "Cycle."[17] For Wu, monopoly is an inevitable part of the business cycle and it is only a matter of how long this cycle will last. He perceives the problem of the current political economy of search as a matter of Google's monopolistic business practices and an uncompetitive market environment.

While scholarly works on the political economy of search have so far been under-developed, there is a long and rich tradition of scholarship on critical political economy of information (PEI) from which my analytical approach draws. Critical PEI focuses specifically on the relationship between information and the overall process of global capitalist development and of democracy by looking at structural changes in ownership, market structure, division of labor, geopolitics of information, commodification of information, privatization and commercialization of information, and government policies. PEI's primary concern is providing an understanding of the role of information and its relationship with political economic system within which it operates.

Grounded in PEI tradition, Dan Schiller's *Digital Capitalism* provides historical context for the development of the Internet into a marketplace. He introduces the concept of digital capitalism in which information and communication is the linchpin of the changing capitalist political economy, and shows how the Internet developed by the US government has been rapidly colonized by corporate interests and market logics, interlocking with neoliberal policy.[18] Schiller's work, *How to Think about Information,* offers the entry point for this project as his work provides an alternative theory of information – information as commodity which is produced, distributed and controlled by

[17] Tim Wu, *The Master Switch: The Rise and Fall of Information Empires* (New York: Alfred A. Knopf, 2010).
[18] Dan Schiller, *Digital Capitalism: Networking the Global Market System* (Cambridge, Mass.: MIT Press, 1999).

profit-making entities within particular historical conditions rather than having inherently economic value.[19] He posits that information is central to capitalist development and that the "information commodity has become the prime site of contemporary expansion within and for the world market system."[20] Information as a commodity form masks the labor that produced the commodity, one of the key underlying dimensions for critical PEI and central to my study of search.

Harry Braverman's *Labor and Monopoly Capital* provides the first critical and systematic analysis of changing labor processes with the growth of service sectors under the capitalist mode of production.[21] He refutes the common claim that modern work due to deployment of science-based technology and automation would result in more "white-collar" jobs that require higher levels of education and training and exercise more intense intellectual work by workers while diminishing low-skilled production jobs. On the contrary, he demonstrates that there has been a strong tendency for mechanization to bring a systematic deskilling and degrading of many working class- as well as "white-collar" jobs. Braverman states that under capitalism "a structure is given to all labor processes that at its extreme polarizes those whose time is infinitely valuable and those whose time is worth almost nothing."[22] Along with Braverman, David Noble's work *America by Design* is relevant to understanding the division of labor in Internet firms. Observing the emergence of an engineer class that obtained control over scientific knowledge in the late 19th century,[23] Noble notes that professional engineers hired by

[19] Dan Schiller, *How to Think about Information* (Urbana: University of Illinois Press, 2006).
[20] Ibid., 41.
[21] Harry Braverman, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century* (New York: Monthly Review Press, 1974).
[22] Braverman, *Labor and Monopoly Capital,* 58.
[23] David Noble, *America by Design: Science, Technology, and the Rise of Corporate Capitalism* (Oxford; New York: Oxford University Press, 1979).

corporations became major agents of corporate capital, showing how new technologies are situated in social processes. Noble links the growth of engineers/managers and science and technology to the building of US corporate capitalism. He demonstrates that professional engineers under corporations promote scientific management as well as automation of production processes with the promise of more control of production and reduced dependence on a work force.

Building on Braverman, Ursula Huws' *The Making of a Cybertariat* theorizes the impact of information technologies on labor processes in domestic work.[24] Huws documents how household technologies such as the washing machine and stove cleaner were promoted to "save" domestic labor; yet, they did not result in liberating women from domestic labor as they had promised. She draws attention to the relationship between domestic work and the adoption of new technologies in the service sector. Huws points out that automation and routinization of service industries to increase productivity and reduce labor cost led to the transfer of work to consumers, a large proportion of which are often women.

Huws' more recent work, *The Underpinnings of Class in the Digital Age; Living, Labour and Value*, extends her labor theory to conceptualize "digital labor."[25] Resonating with Dan Schiller's work on labor theory in *How to Think About Information*, Huws challenges the distinction between "mental" and "manual labor" in a digital-based economy, and argues that, "digital labor cannot be regarded as a discrete form of labor, separated hermetically from the rest of the economy."[26] Rather than dividing "mental"

[24] Ursula Huws, *The Making of a Cybertariat: Virtual Work in a Real World* (London: Merlin, 2003).
[25] Ursula Huws, "The Underpinnings of Class in the Digital Age; Living, Labour and Value," *Socialist Register* 50 (2014): 80-106.
[26] Ibid., 86.

and "manual" labor, she sees that increasing deployment of information technologies generates an ever more complex social division of labor, and posits that growing "digital" or "virtual" labor facilitated by information and communication technologies depends on a material and physical infrastructure. This view challenges autonomist Marxist scholars such as Maurizio Lazzarato, Nick Dyer-Witheford, Michael Hardt, and Antonio Negri who deploy a concept of immaterial labor, considered one of the characteristics of a post-industrial society and distinguished from "physical" labor that produces material goods.[27] In particular, Tiziana Terenova, in her article titled *Free Labor: Producing Culture for the Digital Economy,*[28] associates immaterial labor with free labor on the Web as a distinctive form of labor in the digital economy that builds websites, produces content, offers feedback etc. and is appropriated for creating value for capital.

Richard Gillespie's *Manufacturing Knowledge* and Stanford Jacoby's work *Modern Manors* are valuable to contextualize labor management within historical development as this dissertation situates current labor control practices within a longer historical trajectory.[29] Stanford Jacoby provides detailed accounts on the development of corporate welfare capitalism – corporations providing private welfare programs as a corporate management strategy to counter the rise of labor unions in the 20th century – and shows how it managed to survive over time. In the same historical period, Gillespie's work *Manufactured Knowledge* shows that at the peak of welfare capitalism, social and

[27] Maurizio Lazzarato, "Immaterial Labor," in *Radical Thought In Italy: A Potential Politics*, ed. Paolo Virno et al. (Minneapolis, MN: University of Minnesota Press, 1996), 133-149; Nick Dyer-Witheford, "Empire, Immaterial Labor, the New Combinations," *Rethinking Marxism: A Journal of Economics, Culture & Society* 13, no. 3-4 (2001): 70-80; Michael Hardt and Antonio Negri, *Empire* (Cambridge, Mass.: Harvard University Press, 2001).
[28] Tiziana Terranova, "Free Labor: Producing Culture for the Digital Economy," *Social Text* 63 18, no. 2 (2000): 33-58.
[29] Richard Gillespie, *Manufacturing Knowledge: A History of the Hawthorne Experiments* (Cambridge [England]: Cambridge University Press, 1991); Jacoby, Sanford Jacoby, *Modern Manors: Welfare Capitalism Since the New Deal* (Princeton, NJ: Princeton University Press, 1997).

behavior science were introduced to reduce conflict between labor and capital. The scientific knowledge generated by social scientists on the factory floor presumed its objectivity and became largely accepted by industrial capitalists as "science." However, Gillespie demonstrates that the experiments were constructed and manufactured by paternalist capitalist management ideology, and ignored the power relations between capital and workers. These precedents, I will show, possess a contemporary significance in the Internet industry.

Shifting to the geopolitical dimension of information, Herbert Schiller's *Who Knows: Information in the Age of the Fortune 500* illuminates how information technologies had become central in the global political economy, and notes that, "the information industrial power has become a vital determinant of existing and future power relations within and between nations."[30] His work illustrates how, already by the late 1970s, the US had begun to exert political power to privilege US-based information industries in a bid to restore declining US global political economic power.

Anthony Smith's *Geopolitics of Information* reaffirms the idea that information cannot be separated from other political economic conflicts.[31] While witnessing the movement for a *New International Information Order* (NIIO), Smith warned that new electronics could be a greater threat to national sovereignty of developing countries than colonialism itself. Taking into account that Smith was writing 30 years ago, geopolitics and global political economy have changed. Yet, the geopolitical and economic aspects of information have been heightened today with the emergence of the Internet as a new

[30] Herbert, Schiller, *Who Knows: Information In the Age of the Fortune 500* (Norwood, N.J.: ABLEX Pub. Corp., 1981), 7.
[31] Anthony Smith, *The Geopolitics of Information: How Western Culture Dominates the World* (London: Faber & Faber, 1980).

marketplace, new information domains built over the Internet such as search engines, social media, e-commerce, and mobile phones, and the current global economic crisis. In *Information and the Crisis Economy*, Herbert Schiller offers an extremely germane insight for today in understanding the role of information as the current economic crisis is in the process of restructuring global capitalism.[32] Schiller highlighted how information technologies were utilized and reconfigured to overcome economic crisis and stimulate and revive capitalism by Western nations in the 1980s. As a response to the crisis, there was a rise of conflicts among nations as countries opened up to transnational capital to privatize and commercialize information systems. In the 1980s, Schiller forecasted that the role of transnational corporations (TNCs) would be accelerated in the development of information systems.

Since this scholarship in the political economy of information noted above, there has been a radical transformation of information technologies and international information provision – one which is still taking shape as the Internet has begun to more fully unleash its explosive potential for capital. My dissertation builds on the existing literature and contributes to scholarship on the political economy of information.

Chapter Outline

Chapter one sets the stage by situating search within a broader system of information provision, and illustrates how digital capital ceaselessly seeks to enlarge information markets around the Internet and through the search engine industry. This chapter shows how search engine firms, and in particular Google, were able to establish a point of control on the Internet by examining their accumulation strategies in response to other major dynamic information domains – social media, ecommerce and the mobile

[32] Herbert Schiller, *Information and the Crisis Economy* (Norwood, N.J.: Ablex Pub. Corp., 1984).

Internet. Internet firms are moving into each other's information domains to wrest control over the Internet as they compete and ally to extend their positions of control. The chapter explains that search is at the forefront in the deepening information market, commercializing and commodifying information around the Internet.

While the first chapter describes the current information landscape, the second chapter takes the reader through the history of search engines by tracing the evolution of search business model and search technology. Today, the search engine industry is supported mainly by advertising; however, search engine technology itself did not inherently have economic value. Initially, search technologies developed in non-commercial spaces, and users vehemently resisted the idea of ads-based search engines, believing that search results should not be influenced by commerce. How then has this shift occurred? Chapter two illustrates digital capital's efforts to construct advertising systems that could convert search activities into profit-making businesses. It argues that Google's success is not purely about its superior search algorithm, rather it is capital's process of converting search results into a profit-making project.

Chapters three and four proceed to examine labor processes behind search technologies. Chapter three offers an analysis of the emerging division of labor in the search business. It sketches out three distinctive categories of work – highly skilled, low-waged, and unwaged labor – and demonstrates how this highly automated search engine industry has resulted in the generation of a large number of low-paid contingent workers, and an army of unwaged workers in the form of Internet users. In particular, the chapter illustrates capital's long and persistent effort to incorporate diverse forms of unwaged labor into capitalist accumulation projects.

While chapter three illuminates the labor structure behind search technologies, chapter four extends to an analysis of the labor process and an examination of the methods of labor management for both waged and unwaged workers. Google is known for its unusual working environment where its highly paid workers are given unprecedented freedom, voice within the company, and employee benefits, and unwaged workers are given an array of "free" information utilities. On the surface, Google seems to defy the traditional capital and labor relations and go against capital logic; however, the chapter demonstrates that Google's current labor control techniques are corporate management strategies that stem from an earlier era of industrial economy.

Finally, chapter five explicates the role of geopolitics in organizing the search engine industry and in animating transnational capitalist dynamics. Specifically, this chapter examines the People's Republic of China (PRC) and the European Union where US-based digital capital is facing serious opposition. China constitutes an especially significant exception to Google's market dominance, because it is not only the world's largest Internet market by number of subscribers, and its most significant economic growth zone, but also because its reentry into the US-led global capitalist system is changing the geopolitical landscape. Meanwhile, Europe has been attempting to bolster its information economy, and the tension over the control over information has once again reignited with the emergence of the Internet. Further, Edward Snowden's revelations of US global surveillance programs have renewed deep-seated fears in Europe of US domination. By analyzing these two different conflict zones, the chapter illuminates the role of geopolitics in dynamics of today's transnational capitalism – and, in particular, with respect to the information industry.

Methods & Sources

This project is rooted within the tradition of critical political economy of information (PEI). PEI tries to clarify social changes caused by the growth and global expansion of information industries in terms of the ways in which power is used to "shape the production, distribution, and use of information as a commodity."[33] PEI is distinguished from mainstream economics, in as much as it is historical, and engages with the questions of social justice, equality, and public good.[34] Vincent Mosco describes the four central characteristics of the political economic approach: 1) to understand social and historical changes; 2) to investigate society as a whole or "totality of social relations" including economic, social and cultural dimension of life; 3) to discuss social and moral issues; and 4) to attempt to create social change by transcending the space between theory and practice.[35] Grounded in this intellectual tradition, this dissertation deploys a multilayered historical, political, and international analysis to understand the political economy of search.

This project draws on a wide range of scholarly and journalistic works, government documents, trade/technology journals, major newspapers, industry reports, and technology blogs. The archival trade press related to information industry is an indispensable source to trace the evolution of the business model of search. It offers insight into the interests of different stakeholders, contestations and agreement among them, and policy issues. Given that search engines have evolved into an advertising platform, advertising trade press and reports from trade associations like the *Digital*

[33] Vincent Mosco, "Information in the Pay-per view Society," in *The Political Economy of Information*, ed. Vincent Mosco et al. (University of Wisconsin Press, 1988), 3.
[34] Vincent Mosco, *The Political Economy of Communication*, 2nd ed. (Los Angeles: SAGE, 2009): 22-36.
[35] Ibid., 2-5; Janet Wasko, "Studying the Political Economy of Media and Information," *Comunicação e Sociedade* 7 (2005): 26-27.

Advertising Alliance, and *Interactive Advertising Bureau* also provide an avenue to peer into the dynamics between advertisers and publishers, search engine firms, and into technical and policy issues in the early days of online advertising.

Alongside the trade press, search engine news/blogs such as *John Battelle's Search Blog*, *Pandia Search World*, *Search Engine Round Table, Search Engine Land*, and *Search Engine Watch* are invaluable because they not only specifically document search technologies, search engine marketing strategies, and the industry's responses to users but also other Internet industries that intersect with search such as social media, mobile, and e-commerce. Meanwhile, market reports, industry forecasts, company profiles, financial filings, search engine market data, and statistics indexed in business/industry databases such as *Data Monitor*, *Business Monitor Online, Marketresearch.com*, *Forrest Research*, *Gartner Research*, and *Mintel* present data on specific search engine firm profiles, mergers & acquisitions, revenue sources, regulatory issues, labor markets, market share, market expansion, and political risk in different regions of the world. Additionally, company filings to the Securities and Exchange Commission (SEC) contain dense information on financial flows, revenues, competitors, investment, shareholders, foreign ownership, corporate structure, and market size. These industry resources assist in building the historical groundwork for pinpointing the emergence and expansion of search as a business. They do not provide uniform narratives about the development of search; rather, they open analysis to contradictions and negotiations among various stakeholders and in adjacent industries.

To take into account the changing IT labor structure, *National Science Board's Science and Engineering Indicators*, *Bureau of Labor Statistics*, *Labor Force Silicon*

Valley Index by Joint Venture Silicon Valley and Silicon Valley Community Foundation, OECD's *Science, Technology and Industry Outlook*, and reports on the Silicon Valley workforce from NOVA, a nonprofit, federally funded employment and training agency are extensively examined to collect data on labor force, wage and income, and types of work for the technology industry. This ensemble of resources offers an overarching picture of the labor force and in general the broader trends in the IT workforce within which the search engine industry is located. However, they are limited to identifying specific data on the workforce in the search engine industry. To fill this gap, professional career sites like LinkedIn, Glassdoor, Payscale.com, Indeed.com and companies' human resource pages have been utilized to find out the number of employees including contract workers, types of jobs, and salaries. These databases do not offer accurate data, but they are used as general indicators.

While resources around the US search engine market are easily accessible, materials on the search engine industry in China and Europe are limited because of language barriers, particularly in the Chinese case. Despite this limitation, the English versions of Chinese news sources such as *Xinhua, China Daily*, *Asian Business daily*, *China Digital Times*, and *China Economic Review* are foundational to tracing the overall economic conditions and information industry in general. In addition, Chinese Internet-related Websites such as *China Online Marketing*, *China Internet Watch*, and *China TechNews* are valuable to locate information on business strategies, market developments, as well as news on regulatory changes related to the Internet in China.

For the European Union market, *JRC Information Society Unit, European Commission publications and press release, European Commission's Digital Agenda*

give political context to understanding information policy, regulations, and the economic role of the European ICT industry. Major European news sources and reports from IT lobbying groups like Competitive Online Marketplace and Fair Search also help to investigate transnational capitalist rivalries and track on public policy shifts related to the industry. Finally, US government documents from *Department of Commerce*, *Federal Trade Commission (FTC)*, *Federal Communications Commission (FCC), Department of State*, *Office of the United States Trade Representative (USTR)*, and *U.S. China Economic and Security Review Commission* are examined to understand the role of states as well as geopolitical factors in shaping the direction of the search engine industry.

Chapter 1

Situating Search

The first chapter begins by situating the search engine industry within a broader changing online information landscape in order to call attention to the larger process of commodification in and around the Internet. It shows that the scope of search business is expanding, as search engine firms – in particular Google – are no longer merely trying to control this one domain. To maintain its dominance as well as to expand control over the Internet, search engine giant Google is extending its profit-making endeavors across the Internet, and opening up new "territories of profit" to use Gary Fields' term.[36]

Two decades after the US government relinquished its publicly-funded Internet backbone to private sector corporations, the Internet continues to be radically reconstructed as a consumer medium and global market at the public's expense.[37] But, there is still no shortage of stories exalting the promise of the Internet to lift the human condition, from remote Africa to poverty-stricken rural India to the Amazonian jungle to war-torn Afghanistan to Cairo's Tahrir Square to inner-city America to homeless camps in Silicon Valley. The pretext of promotion of Internet technologies in every part of our lives rests persistently in reducing economic inequality, increasing political participation, and enhancing education, health and democracy. The premise is that if we are all connected to the Web, well-armed and skilled with information technologies, then society could make the shift to becoming more just and equitable. If this utopian ideology is to be

[36] Gary Fields, *Territories of Profit: Communications, Capitalist Development, and the Innovation of G.F. Swift and Dell Computer* (Stanford, Calif.: Stanford University Press, 2004).
[37] Vincent Mosco, *The Digital Sublime: Myth, Power, and* Cyberspace (Cambridge, Mass.: MIT Press, 2004); Schiller, *Digital Capitalism*; Schiller, *How to Thinks about Information*; Robert McChesney, *Digital Disconnect: How Capitalism Is Turning the Internet Against Democracy* (New York: The New Press, 2013).

believed, Internet technologies as a transformative force are supposed to empower the oppressed, challenge oppressors, facilitate the expansion of public goods and deliver a better world.

Despite this persistent mainstream rhetoric, the structural changes that are occurring in the information sphere today are leading in completely opposite directions. Far from moving away from a market economy, the Internet is at the center of economic development in which market logics prevail in determining the shape of the information landscape. Instead of delivering an alternative space to capitalist society where public interests are protected, commons are expanded, and democratic ideals are exercised, the Internet has been turned into a battleground of labor conflict and units of capital for control of new markets. The search engine industry, and in particular Google, is at the fulcrum of this battle.

A Point of Control

The popular notion is that the Internet embodies a decentralized mode of provision; thus, no one entity can control it. In the widely-cited book *The Wealth of Networks,* Yochai Benkler celebrates this technical architecture of the Internet, posits how the networked information economy is different from the industrial economy of the pre-Internet era, and promotes a new mode of production that is outside of the market economy.[38] Yet, contrary to Benkler's optimism, capital has a firm grip over the Internet while democratic information activities are mainly marginal. Google's Executive Chairman Eric Schmidt at the D9 conference in 2011 said that the "Internet is now ruled

[38] Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006).

by Google, Amazon, Apple and Facebook."[39] Along these lines, in 2012, cyberpunk author Bruce Sterling wrote: "it made less and less sense to talk about 'the Internet,' 'the PC business,' 'telephones,' 'Silicon Valley,' or 'the media,' and much more sense to just study Google, Apple, Facebook, Amazon and Microsoft."[40]

These descriptions are limited because participation in the full Internet political economy is wider transnationally and multi-sectionally; however, they offer an entry point to situate search industry within the larger information landscape. On the one hand, these most dynamic information domains – search, social media, e-commerce, operating systems, handheld devices – appear on the surface to be separate information spheres. Yet, they are each moving into each other's territories in order to defend their existing profit centers and to cultivate new profit opportunities. They constitute centers of gravity facing new major competitors and ever-changing alliances. The search industry therefore takes us to the heart of the overall domain.

The search engine industry, as described by Van Couvering, started its core business of navigation services predicated on media platforms that mediate between the user and content in the networked environment.[41] The industry is an intermediary, based on creating and exploiting Web traffic as its primary asset or saleable good. Considering this position strictly within the Internet "ecosystem," the search business was technically vulnerable. Whoever controlled the network infrastructure level – i.e., AT&T, Comcast or other telecommunication companies – might attain leverage over search functions

[39] Rafe Needeman, "Eric Schmidt: 'Gang of four' rules tech," *CNET*, May 13, 2011, http://www.cnet.com/news/eric-schmidt-gang-of-four-rules-tech/.
[40] Jon Evans, "The Internet: We're Doing It Wrong, 2013," *Tech Crunch*, August 18, 2013, http://techcrunch.com/2013/08/18/the-internet-were-doing-it-wrong/.
[41] Van Couvering, "Navigational Media: The Political Economy of Online Traffic"; Van Couvering, "Search engine bias."

themselves.[42] Yet, contrary to the limitation of technical structure, Google and the search engine industry – extending to Yahoo! and Bing – without owning the backbone and its own content were initially able to establish a new point of control on the Web by focusing on the information discovery function.

By situating itself between users and the Internet, the search engine industry established a critical point of control over information access. Tim Wu describes Google as controlling the "Master Switch" on the Web in similar fashion to telephone girls at switchboards in the past, who made connections between parties, and to the switch that can determine who and what to connect.[43] This rise of the search engines, in particular Google, as an access point to the Internet has shifted the dynamics of and destabilized the information landscape – and spurred the creation of Search Engine Optimization (SEO), an entirely new parasitic multi-billion dollar marketing industry. The content industries now have to rely on the search engine to reach potential audiences on the Web. Google's ongoing disputes with publishing, newspaper, music, and film industries over copyright issues and privacy, computer and mobile industry over patents and antitrust cases and telecommunication industry over "net neutrality" around the world are showing the battle to be between different units of capital and the growing power of the search engine industry over the Internet. How was it that Google and the other search engines, which owned neither network nor content, were able to establish such a point of control on the Web?

Traditionally, a search engine's function is to point to content. Echoing this notion, Google touted its success that it "…may be the only company in the world whose stated

[42] Wu, *The Master Switch*, 284.
[43] Ibid.

goal is to have users leave its Website as quickly as possible."[44] In 2010, Eric Schmidt reiterated this point once again and said Google would not create content but simply be a conduit for it; he was "careful to define a line where we don't cross into content" and wanted to remain a "neutral platform for content and applications." Yet, search engine firms are no longer merely pointing to information; rather, increasingly they own, manage, host, store, digitize and duplicate information to maintain and extend their marketplace and to pre-empt potential high profit functions and services.

Search engine firms are increasingly expanding their ownership of Web properties by creating "free" services, offering a wide range of data, content, services and applications, and incorporating them into their domain of profit. As against Schmidt's claim that Google is merely a conduit to information, it is actually weaving through the entire Internet commodity chain to extend its profit territories. The company has indeed expanded its focus to encompassing the Internet backbone, hardware, content, services and applications.

Google's 2013 annual report corroborates that its business is no longer limited to search. It reports that Google's core businesses are search and display advertising, the Android operating system platform, consumer content through Google Play, Enterprise, Commerce and hardware products.[45] The company competes with any companies that "seek to connect people with information on the Web and provide them with relevant advertising."[46] Google is undoubtedly one of the major players on the Internet; however, its position of control on the Internet is far from secure given the Internet industry's

[44] Matt McGee, "Google's New Philosophy: We're A Portal," *Search Engine Land,* September 9, 2010, http://searchengineland.com/googles-new-philosophy-were-a-portal-50216.
[45] Google Inc. *2013 annual report*, http://investor.google.com/pdf/20131231_google_10K.pdf.
[46] Ibid.

dynamism and volatility. Rather, the search giant is battling to keep its position as the main gateway for consumers to the Internet as it tries to defend its core ads business as well as diversifying into new markets to enlarge its profit territories – which lead it to engagement in multipoint competition and strategic alliances across markets.

Unfinished Battle

Since early 2000, Google has been the unquestioned leader of the global search engine market. This makes it seem as if the search market is fully stabilized; yet, in reality, it is far from stable. Besides emerging competitors Baidu in China and Yandex in Russia, Google's major domestic search rivals Yahoo! and Bing are still in the game with 10.0% and 19.3% market share respectively in the US.[47]

While they have sustained a foothold, Yahoo! and Bing have not been able to earn a bigger market share in search. Thus, in 2009, the two companies built a strategic alliance to combat Google by striking a 10-year deal where Microsoft agreed to provide search results on Yahoo!. In return, Yahoo! would be responsible for ads sales and for attracting premium ads. Under the agreement, Microsoft will pay Yahoo! 88% of the revenue it gains from search on Yahoo!'s site[48] while it integrates Yahoo!'s search technology into its own existing Web search platforms.[49] For this deal, Yahoo! gave up its search technologies and outsourced to Bing. Yet, the alliance did not bear the fruit that they anticipated, and so far Yahoo! has been earning very little under Bing-powered search.[50]

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[47] "US Search Engine Ranking," *ComScore*, September 17, 2014, http://www.comscore.com/Insights/Market-Rankings/comScore-Releases-August-2014-US-Search-Engine-Rankings.
[48] David Goldman, "Microsoft and Yahoo: Search partners," *CNN,* July 29, 2009, http://money.cnn.com/2009/07/29/technology/microsoft_yahoo/.
[49] Ibid.
[50] Danny Sullivan, "As The Yahoo-Microsoft Search Alliance Falls Short, Could A Yahoo-Google Deal Emerge?" *Search Engine Land*, July 12, 2012, http://searchengineland.com/yahoo-microsoft-search-alliance-google-127843.

In 2013, according to the *Wall Street Journal*, Yahoo!'s ad revenue from search dropped 10%, and its display-ad revenue, about 40% of the company's sales, dropped 11% from the previous year.[51] Today, most of Yahoo!'s profits come from China-based e-commerce giant Alibaba, where Yahoo! still holds a 24% stake after selling back 16% to Alibaba. Yahoo! received $7.6 billion in cash and stock to sell half of its holdings.[52]

With cash from its Alibaba holding, Yahoo! purchased the Tumblr social network for $1.1 billion as well as nearly 40 other start-ups. After these acquisitions, many of the products were shut down; Yahoo!'s intention was to obtain engineers. Since CEO Marissa Mayer, a former Google executive, took over the company in 2012, Yahoo! has been trying to revive its sagging business by focusing on the mobile market. Yahoo! Senior Vice President of Mobile and Emerging Products Adam Cahan said, "we used talent acquisition as one of those ways of getting us to scale … The vast majority have been, by the numbers, talent deals."[53] Because of its acquisition spree, the number of mobile engineers at Yahoo! increased from about 37 in 2012 to more than 500 in 2014.[54] In 2012, the company formed its mobile unit and has reorganized most of its existing Web properties, including Weather, Finance, Flickr etc., to make them compatible with smartphones and tablets. As Yahoo! pushes for a mobile-first strategy, the company is also beefing up its content business by launching a mobile-friendly digital magazine platform and producing original content to host Yahoo!'s expansive native advertising.

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[51] Amir Efrati, "Yahoo's Ad Struggles Persist," *Wall Street Journal,* April 15, 2013, http://online.wsj.com/news/articles/SB10001424127887323346304578427052911177678.
[52] Michale Liedtke, "Yahoo closes $7.6 billion deal with Alibaba Group," *Yahoo Finance*, September 18, 2012, http://finance.yahoo.com/news/yahoo-closes-7-6-billion-deal-alibaba-group-161614948--finance.html.
[53] Richard Nieva, "Yahoo's mobile chief: Acquisition spree about playing 'catch-up,'" *CNET*, June 8, 2014, http://www.cnet.com/news/yahoos-mobile-chief-says-acquisition-spree-is-about-playing-catch-up/.
[54] Ibid.

With 400 million monthly mobile users, Yahoo! is searching for new business alliances since the company does not own the phone, operating system, browser or a massive user base like Apple, Google or Facebook. Yahoo! CEO Mayer stated that the company had to rely on strong partnerships with other Internet firms as Yahoo! aims to increase its presence in mobile business. In particular, Yahoo! has been seeking a deeper strategic alliance with Apple; Apple has captured the largest smartphone share and 60% of all smartphone profits in the US,[55] and Yahoo! is already supplying data to power Apple's voice-activated search Siri, and Yahoo!'s Finance and weather sites are preloaded in iPhones and iPads.[56] Through this strategic partnership with Apple, Yahoo! intends to increase its Web traffic and turn into a bigger mobile player. Apple's partnership with Yahoo! is not altruistic or sympathetic toward struggling Yahoo!. It is a way to push against Google, and to seek an alternative to Google's content and services, given Apple still uses Google's search service as the default on Apple's mobile devices.[57] For Apple, Yahoo! is a perfect partner as there are no overlapping business interests between them since Yahoo! owns neither hardware, operating system nor mobile app store.[58]

Meanwhile, despite its struggles to gain search market share, Microsoft has so far held onto its search engine Bing. As of 2014, Bing has 18.2 percent of all searches – an

[55] Chuck Jones, "Apple's U.S. Smartphone Market Share Holding Steady Against Every Competitor," *Forbes*, April 7, 2014, http://www.forbes.com/sites/chuckjones/2014/04/07/apples-u-s-smartphone-market-share-holding-steady-against-every-competitor/.
[56] Amir Efrati and Jessica Lessin, "Yahoo, Apple Discuss Deeper iPhone Partnership," *Wall Street Journal,* April 9, 2013, http://online.wsj.com/news/articles/SB10001424127887324050304578413151401633878.
[57] Ibid.
[58] Ibid.

all-time high – and a gain from 16.3 percent in December 2012.[59] Yet, even after allying with Yahoo!, Bing hasn't made a dent in Google's search market dominance. Microsoft's Online Services Division is one of its most expensive operations, having lost around $11 billion since 2005.[60] It is revealing that Microsoft apparently believes that it cannot afford to ground its costly albatross Bing.

Microsoft co-founder Bill Gates sees search as a fundamental technology and core business for Microsoft.[61] Bing is integrated into various Microsoft products and services including Windows Phone 7, streaming video, live TV on the Xbox, and Windows 8.[62] Thus, it's hard to untangle; but more importantly search is also a key strategic piece to expand into the mobile sector. In 2013, Microsoft acquired Nokia's smartphone business and spent another $2.2 billion to license the company's intellectual property. By obtaining a phone manufacturer, Microsoft is trying to follow Apple's accumulation strategy model that deeply integrates hardware, software, and services. Nokia is still the second biggest phone maker in the world behind Samsung; thus, with this acquisition, Microsoft is now the world's second largest cell phone manufacturer by sales. By leveraging its Nokia market power, Microsoft is betting on a global mobile search engine to power its mobile services. Yet, there is another reason for Microsoft to keep Bing, whose growth hinges on the international market. Given global Internet penetration is still roughly 35%, there are many countries where the search market has not been developed or occupied by Google

[59] Matt McGee, "Bing Ends 2013 With All-Time High In US Market Share, But Google Also Up," *Search Engine Land*, January 15, 2014, http://searchengineland.com/bing-ends-2013-with-all-time-high-in-us-market-share-but-google-also-up-comscore-181876.
[60] Brad Reed, "Microsoft reportedly still refuses to give up on Bing," *BRG*, September 3, 2013, http://bgr.com/2013/09/03/microsoft-bing-future-plans/.
[61] Greg Sterling, "Sell Bing? Makes No Sense, Says Microsoft's Bill Gates — It's A Core Business," *Search Engine Land,* May 7, 2014, http://searchengineland.com/bill-gates-bing-fundamental-technology-microsoft-190793.
[62] Tim Carmody, "Why Microsoft Can't — and Shouldn't — Give Up on Bing," *Wired,* July 28, 2011, http://www.wired.com/2011/07/future-of-microsoft-bing/.

or other search engine firms. Microsoft seeks its future growth in this still expansionary international market.

Defending the Core

While Yahoo! and Bing are trying to maintain their footing in the search market, Google is busy defending its core business – advertising. Google's search ads remain its essential profit source. However, as the nature of search shifts and people increasingly use mobile devices to find what they want to buy, eat, entertain and learn, Google's desktop search ads are expected to decline. To mitigate future losses in desktop search ads revenue, Google is looking for new ads venues for a bigger piece of the advertising pie. And it has been turning its attention to display ads for brand advertising in which Yahoo! was once the main player.[63] Google sees display as one of the next big drivers of its revenue growth, and it is readying itself to conquer this space. According to the *Wall Street Journal*, approximately 1,000 of Google's engineers have been deployed to work on display technology.[64] Due to the rise of online video, social media and mobile, the online display ad market has been growing at 21% annually – opposed to 13 percent annual growth for paid search – and is expected to reach $74.4 billion in 2016.[65] Display advertising across all platforms grew by 32.4% globally in 2013 – the greatest increase of

[63] Mark Sweney, "Google targets big brand advertisers with 'game-changing' technology," *Guardian*, December 28, 2013, http://www.theguardian.com/technology/2013/dec/29/google-advertising-viewability-technology.
[64] Amir Efrati, "Google Display Chief Makes Pitch to Publishers," *Wall Street Journal,* June 23, 2011, http://blogs.wsj.com/digits/2011/06/23/google-display-chief-makes-pitch-to-publishers/.
[65] Ginny Marvin, "Display To Eclipse Paid Search Ad Spend In 2016, Mobile Set To Become 4th-Largest Ad Medium," *Marketing Land*, April 7, 2014, http://marketingland.com/display-eclipse-paid-search-ad-spend-2016-mobile-set-become-4th-largest-ad-medium-79309.

any segment in the ad market, but still only 4.5% share of the total.[66] According to ZenithOptimedia, spending on display advertising will soon overtake paid search.[67]

Google's $3.1 billion acquisition of display ads company DoubleClick in 2007 was a milestone in its efforts to extend its business beyond search ads.[68] Google's road to display ads was paved by the state as the Federal Trade Commission (FTC) cleared the merger between DoubleClick and Google despite opposition from privacy advocates who pointed out that the deal would lead to the control of more private data by one single company. DoubleClick had been the long-standing leader in behavioral advertising, having built its business through consumer profiling during the dotcom era of the 1990s.[69] By integrating DoubleClick into its massive advertising infrastructure, Google was able to build the world's largest display ads platform. With the acquisition of DoubleClick, Google quickly captured 12.6 percent of the US display ads market.[70]

Google sells display ads on its own Websites, mainly on YouTube as well as through more than two million Web publishers using an automated marketplace in Google's DoubleClick Ad Exchange.[71] In particular, Google is augmenting YouTube content and repackaging it to appease TV advertisers, given TV advertising revenue is

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[66] Ingrid Lunden, Internet Display Advertising Grew 32%" *Tech Crunch*, 2014, January 27, 2014, http://techcrunch.com/2014/01/27/nielsen-internet-advertising-grew-32-in-2013-but-its-still-only-4-5-of-spend-vs-tv-at-57-6/.

[67] Ginny Marvin, "Display To Eclipse Paid Search Ad Spend In 2016, Mobile Set To Become 4th-Largest Ad Medium," *Marketing Land*, April 7, 2014, http://marketingland.com/display-eclipse-paid-search-ad-spend-2016-mobile-set-become-4th-largest-ad-medium-79309.

[68] Catherine Holahan, "Google's DoubleClick Strategic Move," *Business Week,* April 14, 2007, http://www.businessweek.com/stories/2007-04-14/googles-doubleclick-strategic-movebusinessweek-business-news-stock-market-and-financial-advice.

[69] Crain, "The Revolution will be Commercialized."

[70] Megan Garber, "Google plans for "the second phase of the display ad revolution" with a focus on smartphones and tablets," *Nieman Journalism Lab*, June 28, 2011, http://www.niemanlab.org/2011/06/google-plans-for-the-second-phase-of-the-display-ad-revolution-with-a-focus-on-smartphones-and-tablets/.

[71] Amir Efrati, "Google Display Chief Makes Pitch to Publishers," *Wall Street Journal,* June 23, 2011, http://blogs.wsj.com/digits/2011/06/23/google-display-chief-makes-pitch-to-publishers/.

still the largest advertising segment. Google quickly realized that in order to attract more premium advertisers, YouTube had to have high-quality, professionally produced content to spur advertisers to spend premium ad dollars on branded programming.[72]

Hence, in an effort to enrich its content inventory, Google has even begun to invest in content production to lure future advertisers. In 2011 – 2012, Google invested over 100 million dollars to produce and distribute professional quality video on its 100+ original channels exclusively to its YouTube platform.[73] Yet, this did not increase viewership as the company had expected; so now Google is taking a different approach to be closer to the content that can draw viewers. This time they're doing that with physical production spaces.

Google has been opening up studio space to provide creators with needed production space and resources. The company has physical production sites in London, Los Angeles, Tokyo, and New York where content creators can use the YouTube video production facility free of charge. But then the question remains: Why is Google involved in the movie Studio business and offering the space to content creators for free? This is Google's consistent business strategy. It offers "free" services in order to attain a privileged market position; with this long view in mind, Google is betting that there is big potential profit for the company by backing creators with "free" production resources.

Ultimately, Google's aim is to generate more premium YouTube content, which it hopes will lead to larger audiences, more ad revenues and diversified revenue sources.[74] Google publicizes the studio as "free" space, but content creators must apply to use the

[72] Matthew Garrahan, "Google invests in YouTube studio in LA," *Financial Times*, July 12, 2013, http://www.ft.com/intl/cms/s/2/3f4c846a-e9c1-11e2-bf03-00144feabdc0.html#slide0.
[73] Jon Russell, "YouTube prepares its second Channels push, 60% of content partners to lose funding," *TNW*, November 12, 2012, http://thenextweb.com/media/2012/11/12/youtube-set-to/.
[74] Garrahan, "Google invests in YouTube studio in LA."

facility. In order to qualify, content creators must have YouTube channels with at least 10,000 subscribers and 100,000 views per month. While Google does not claim ownership of the content, its strategy is to improve the quality of YouTube channel programs to draw premium advertising and to expand its paid channels by investing in resources. Paralleling the building of studio spaces, the company is boosting up its content efforts by bringing in major partners including Fuji TV, TBS, Vicom and Crypton Future Media, Dentsu and manga publisher Shuseisha to produce YouTube channels and investing $35 million in Machinima, one of YouTube's most popular networks.[75]

Google, of course, isn't the only company chasing after this growing display ads market.[76] Although Google pulled down $4 billion in the US display ad space in 2013, players like AOL, Amazon and Facebook are closing the gap.[77] In particular, social media giant Facebook has been directly going after Google's main ads revenue sources. Facebook has been drawing on its massive user base and hoarding "intent data" which is at the core of the search engine industry.[78] As of 2013, Facebook had over 1.23 billion active users who generate content, and data in interaction with each other.[79] Facebook

[75] Josh Ong, "Google's YouTube Space production studio arrives in Asia with new Tokyo location," *TNW,* February 16, 2012, http://thenextweb.com/google/2013/02/14/googles-youtube-space-production-studio-arrives-in-asia-with-new-tokyo-location/; Ryan Lawler, "Machinima Gets $35M In Funding, Led By Google," *Tech Crunch*, May 21, 2012, http://techcrunch.com/2012/05/21/machinima-youtube-35m/.
[76] Frederic Lardinois, " Google Launches Partner Select, A Programmatic Video Ad Marketplace For Premium Content," *Tech Crunch*, June 4, 2013, http://techcrunch.com/2014/06/04/google-launches-partner-select-a-programmatic-video-ad-marketplace-for-premium-content/.
[77] Kelly Liyakasa, "Facebook Pulls Ahead Of Google In US Digital Display Ad Revenues," *adexchanger*, March 11, 2014, http://www.adexchanger.com/online-advertising/report-facebook-pulls-ahead-of-google-in-us-digital-display-ad-revenues/.
[78] Maurice Coyle, "How Facebook beat Wall Street with data and tripled its share price," *TNW*, July 21, 2014, http://thenextweb.com/socialmedia/2014/07/21/facebook-beat-wall-street-data-tripled-share-price/.
[79] Emil Protalinski, "Facebook passes 1.23 billion monthly active users, 945 million mobile users, and 757 million daily users," *TWN,* January 29, 2014, http://thenextweb.com/facebook/2014/01/29/facebook-passes-1-23-billion-monthly-active-users-945-million-mobile-users-757-million-daily-users/.

challenges Google's most lucrative business as it offers information through social engagement within the Facebook platform, bypassing users' need for Google. In response, Google launched its own social media platform Google Plus (Google+) and has been trying its hand in the social media market. It has not been able to combat Facebook, and in July 2014 Google announced that its first social networking site Orkut – which had been popular in Brazil and India – would be shutting down after years of struggling against Facebook.

Facebook is now the second most visited Website in the world after Google, and gets about 82% of its revenue from advertising, with the rest coming from fees resulting from its Credit Platform, which provide payment services to gaming partners like Zynga. It pulled in $7.8 billion in revenue in 2013, far behind Google's $50+ billion revenue. After its IPO in 2012, Facebook's viability was questioned by its investors, as the company had not been able to fully monetize its user traffic. This is rapidly changing, particularly in the mobile space, which will be illustrated in more detail in a later section. Facebook is turning into a mobile company with the potential to take a significant amount of advertising dollars away from Google.

From a different direction, Amazon, Google's biggest advertiser, is also threatening Google's core business. As more Internet users begin their searches on Amazon's marketplace and bypass Google, Google loses an opportunity to show them ads.[80] Over the years, Amazon has become the search engine for e-commerce, which also cuts into

[80] Rolfe Winker, "Amazon vs. Google: It's A War for the Shopping Search," *Wall Street Journal*, December 20, 2013, http://online.wsj.com/news/articles/SB10001424052702304173704579265421113585650.

Google's core function and pulls away searchers from Google's own Web properties.[81] If Google has built its advertising business by transforming the Internet into an ads platform, Amazon, the modern day Sears catalog, has built its business by organizing the Internet as a vehicle for retail business. Since Google is selling ads and Amazon is selling products, they would seem to be in two different business areas. However, since the same companies who buy ads on Google are the companies who sell products on Amazon, if searchers are going directly to Amazon and bypassing Google to find products to purchase then those companies might pull or reduce ads spending on Google. So far, Google has not lost traffic due to Amazon, but to defend if not extend its core business, the company wants to deter searchers going straight to Amazon by becoming a destination site, not just to offer information about products, but to sell them.[82]

Thus, Google is now moving into Amazon's e-commerce domain. Google's interest in e-commerce goes back to 2000 when its shopping search engine was called Froogle, but it remained a peripheral business. At that time, Google merely crawled and indexed product data from vendors' Websites and monetized it using AdWords ads platform.[83] But in 2007, Froogle was renamed *Google Product Search* and was integrated into Google Search; listings from the service appeared in Web search results. Google Product Search was not even listed on the main home page and was under "More" options.[84] However, by 2012, Google had fully engaged in the e-commerce business as it again revamped and rebranded its product as *Google Shopping*. Google changed the service

[81] Marcus Wohlsen, "Google's Plan to Snatch Shopping From Amazon Is Working," *Wired*, http://www.wired.com/2013/01/google-takes-on-amazon/.
[82] Ibid.
[83] Wikpedia, "Google Shopping," *Wikipedia*," last modified August 24, 2014, http://en.wikipedia.org/wiki/Google_Shopping.
[84] Danny Sullivan, "Goodbye Froogle, Hello Google Product Search!" *Search Engine Land*, April 18, 2007, http://searchengineland.com/goodbye-froogle-hello-google-product-search-11001.

from a free- to paid-for inclusion model in which merchants paid Google to list their products, services and display images of said products on Google search results pages.

Google's move to paid listings is a radical change from its original business principles. Google distinguished itself from early paid search engines like GoTo.com in which businesses had to pay in order to be included in search results. Google denounced paid listings, saying it would never implement this practice. As Danny Sullivan, a Founding Editor of Search Engine Land, quickly pointed out, when Google filed its IPO in 2004, it specifically indicated that paid inclusion should be condemned, saying this under the "Don't Be Evil" section of the founders letter:[85]

> Google users trust our systems to help them with important decisions: medical, financial and many others. Our search results are the best we know how to produce. They are unbiased and objective, and we do not accept payment for them or for inclusion or more frequent updating.[86]

At that time, Google's firm stand against paid listing even pressured Microsoft and ASK.com to drop their paid inclusion programs, and Yahoo! finally dropped its program in 2009.[87] Why then did Google bring back the paid inclusion model that the company had so vehemently denounced?

Google is waging a war against Amazon, which currently dominates Internet retail and is threatening Google's search business. In 2012, the *Forrest Report* claimed that 30% of all online shoppers started their product search at Amazon, which constitutes a

[85] Danny Sullivan, " Once Deemed Evil, Google Now Embraces 'Paid Inclusion'," *Marketing Land*, March 30, 2012, http://marketingland.com/once-deemed-evil-google-now-embraces-paid-inclusion-13138.
[86] Ibid.
[87] Danny Sullivan, "Google "Comparison" Units Get New Look; Change Highlights Paid Inclusion In Some Vertical Search Areas," *Search Engine Land*, April 30, 2012, http://searchengineland.com/google-comparison-units-get-new-look-change-highlights-paid-inclusion-in-some-vertical-search-areas-119865.

direct threat for Google's core business.[88] By incorporating retail business into Google's business domain, the company is trying to protect its search business as well as move into the lucrative adjacent e-commerce market, which reached $225 billion in 2013 according to the U.S. Department of Commerce.[89]

By leveraging its dominance in search, Google is today determined to take a bigger piece of the e-commerce market as well. Google's e-commerce ambition shows in displays on its search results.[90] For a long time, Google insisted that advertisers use only small text ads, but now Google's *Product Listing Ads (PLA)* first served up images along with price at the top premium area on search results, then on top of ads results on the side when users conducted searches for related products. In fact, Google's product-listing ads have been attracting advertisers, and Walmart and eBay Inc. are the top buyers of Google's product ads.[91] It even launched Google Shopping Express same-day delivery in San Francisco, Los Angeles, and New York City after Amazon announced it was offering same-day shipping in 12 cities. Google wants to make sure that they are in every path of users' information activities from search to delivery of actual products direct to consumers' doors.

While both are profiting off Internet consumers, Amazon as a retailer generates its profit directly through transactions while Google profits by sending traffic to merchants.

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[88] Rick Backus, "Google Drops Its Veil At Times, Reveals Ecommerce Ambitions," *Search Engine Land*, September 6, 2012, http://searchengineland.com/google-drops-its-veil-at-times-reveals-ecommerce-ambitions-131321.
[89] Bruce, Kelly, "What's At Stake As Google Takes On Amazon?" http://www.investopedia.com/articles/investing/053014/whats-stake-google-takes-amazon.asp.
[90] Rick Backus, "Google Drops Its Veil At Times, Reveals Ecommerce Ambitions," *Search Engine Land*, September 6, 2012, http://searchengineland.com/google-drops-its-veil-at-times-reveals-ecommerce-ambitions-131321.
[91] Rolfe, Winker, "Amazon vs. Google: It's A War for the Shopping Search," *Wall Street Journal*, December 20, 2013, http://online.wsj.com/news/articles/SB10001424052702304173704579265421113585650.

This is the key difference in accumulation strategies. Google doesn't have Amazon's inventory nor an industrial-sized infrastructure by way of Amazon's regional distribution centers; instead, it relies on third-party retailers that consumers access through the Google search engine.[92] Amazon's growth has come at massive capital cost with thin profit margins,[93] but Google, with its deep pockets and profitable ads business, is enhancing its e-commerce business and at the same time protecting its advertising business from Amazon.

Meanwhile, Amazon is also eyeing Google's turf in online advertising as the company is trying to diversify its revenue sources. Amazon has 237 million active customers' data collected over decades. It's not merely clickstream data and payment information, but also detailed shopping data of what people searched for.[94] Madison Avenue calls this "intent" data, which are used by marketers to target sales along with demographics, geography, lifestyle, and purchasing patterns. Jeff Lanctot, the chief media officer for Razorfish, the Seattle-based digital marketing agency, said, "Amazon understands better than anyone else what consumers want."[95] Advertisers have been demanding that Amazon disclose their consumers' behavioral data, while Wall Street would look to Amazon to generate profit from advertisers. Increased profit margins from ad sales could help mitigate Amazon's high capital costs and thin profit margin retail strategy. Amazon has been experimenting with ad platforms, searching for advertising

[92] Jess Bolluyt, "Google Takes on eBay, Amazon With Shopping and Search Update," *Wall St. Cheat Sheet***,** June 20, 2014, http://wallstcheatsheet.com/technology/google-takes-on-ebay-amazon-with-shopping-and-search-update.html/?a=viewall.
[93] George Anders, "No Stores? No Salesmen? No Profit? No Problem for Amazon," *MIT Technology Review*, November 7, 2013, http://www.technologyreview.com/news/520801/no-stores-no-salesmen-no-profit-no-problem-for-amazon/.
[94] Jay Greene, "Look out, Google: Amazon's eyeing your turf," *CNET,* 2013, May 24, 2013, http://news.cnet.com/8301-1023_3-57586017-93/look-out-google-amazons-eyeing-your-turf/.
[95] Ibid.

strategies that won't repel its customers, and developing ads for Amazon Prime Instant and Kindle devices. Amazon incentivizes consumers to get used to its ads by offering subsidized rates for devices with ads. While Amazon's $1 billion ad revenue is still merely 1% of their annual revenue in 2013, and nothing close to a threat for Google, it has already increased its ads revenue higher than Twitter, Pandora and LinkedIn.[96]

An *Economist* article once equated the current battle over the Internet by major Internet firms to George R.R. Martin's fantasy novel *Game of Thrones*, complete with power plays in fractious and rapidly changing landscapes.[97] The battle here is among big units of digital capital as they seek to control their own domains while extending and searching for new territories to conquer.

Going Mobile

Google's chief business officer Nikesh Arora once stated, "The fundamental tenet is not to speak about mobile, mobile, mobile. It's really about living with the users."[98] That is, the tenet of digital capital is not just maintaining dominance over one's own domain; rather, its aim is to organize and reorganize every inch of people's social lives into the profit domain. Given this expansionist ambition, mobile Internet is a vital platform for digital capital, the goal to live with users and their always-on mobile devices tied to an individual identification that can be tracked and monitored. The integration of mobile phone and Internet connectivity allows for digital capital to overcome physical

[96] Jay Greene, "Amazon easing into $1B sideline business: as sales," *Seattle Times*, March 18, 2014, http://www.seattletimes.com/business/amazon-easing-into-1b-sideline-business-ad-sales/.
[97] "Technology Giants At War," *Economist,* December 1, 2012, http://www.economist.com/news/21567361-google-apple-facebook-and-amazon-are-each-others-throats-all-sorts-ways-another-game.
[98] Claire Miller, "Revenue and Profit Rise at Google, but Mobile Is a Persistent Challenge," *New York Times,* January 30, 2014, http://www.nytimes.com/2014/01/31/technology/revenue-and-profit-rise-at-google-but-mobile-struggles-continue.html.

obstacles to reach consumers 24/7 and to expand space and time for capitalist production in previously untapped markets.

By the early 2000s, Google had begun to test mobile services such as Google search service over Google SMS service, maps and Gmail. Yet, its real mobile strategy was revealed when it acquired mobile-phone software startup Android – which had been founded by Andy Rubin, a former Apple hardware designer. And in 2007, Google unveiled its Android mobile operating system shortly after Apple released its first iPhone while Google was still an app partner for iPhone. Google's introduction of Android was a shot across Apple's bow and into its mobile business turf.

These two firms have taken entirely different accumulation strategies – Android is an open-source system while Apple is a closed system, a walled garden. Apple took a closed system approach, allowing only Apple-approved applications on its devices; by contrast, Google's open-source approach gives Android OS away to be installed on as many phone models as possible including Samsung, LG, HTC, Sony, and Motorola. Eric Schmidt declared, "Android is by far the primary vehicle by which people are going to see smartphones … Our goal is to reach everybody."[99] Google's open source strategy is able to reach mobile users widely, but the question remaining – whether open or closed source – is how to generate revenue?

Since Android is free to device makers, Google couldn't make money from the devices themselves. So the options for Google's mobile business were advertising and/or subscriptions for Google services. Google's choice took its most familiar route – advertising. Google has been extending its ads business into the mobile space, all the

[99] Vittorio Hernandez, "Google's Eric Schmidt Foresees Android Smartphone Users to Hit 2 Billion in Next 2 Years; Gives Thumbs Up to New Motorola Gadgets," *International Business Times*, April 17, 2009, http://au.ibtimes.com/articles/458005/20130417/google-s-eric-schmidt-foresees-android-smartphone.htm.

while not excluding other sources of revenue. Compared to Apple, which generates its revenues from selling its hardware, Google's revenue has been concentrated in mobile ads placed on Google's services that are preloaded on Android phones and Android mobile apps.

In 2008, Google introduced AdSense for display ads on mobile phones,[100] which is similar to Google's AdSense program that places ads on traditional Websites. Yet, Google shortly thereafter acquired AdMob for $3.2 billion – the mobile ad platform which offers advertising on mobile Websites as well as inside mobile apps.[101] Google's AdMob deploys a platform-agnostic approach, allowing developers to place ads on Android, iOS, and Windows phones. To compete against Google's AdMob, Apple launched iAds, its mobile ads platform, integrating advertisements into applications sold only on its iOS App Store. Apple has been trying hard to chip away at Google AdMob's lead in mobile advertising and expanding its revenue sources. In 2012, Apple even reduced prices for developers for iAd, dropping the minimum spending from $500,000 to $100,000 and boosting developers' ad revenue from 60% to 70%.[102] Yet, Google still remains in the dominant position in the global mobile ads market with 49.3%, even though its market share has slightly declined from its 53% share in 2012.[103] In the mobile ads market, Google is increasingly facing off with Facebook – not Apple – on a number of mobile advertising fronts.

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[100] "Why Google Is Buying AdMob," *Business Week*, November 9, 2009, http://www.businessweek.com/technology/content/nov2009/tc2009119_588360.htm.
[101] "We've officially acquired AdMob!" *Google Official Blog*, March 27, 2010, http://googleblog.blogspot.com/2010/05/weve-officially-acquired-admob.html.
[102] Mark Bergen, "Build Your Own iAd: Apple Throws Open Door to Platform," *Advertising Age,* April 1, 2014, http://adage.com/article/digital/apple-expands-iad-developers-adds-video-capabilities/292412/.
[103] Jason Abbruzzese, "Google and Facebook Control Two-Thirds of Global Mobile Ad Market," *Mashable*, March 19, 2014, http://mashable.com/2014/03/19/google-facebook-dominate-mobile-ads/.

As late as 2011, Facebook had no mobile ad revenue. At the time of Facebook's IPO, Wall Street was still questioning whether the company would be able to monetize millions of users' activities. After Facebook's IPO in 2012, the company was under intense pressure from shareholders to make a profit off of its mountain of personal data from 1 in 9 people on Earth.[104] Today it is the second largest player in the mobile space and has reached nearly 22% of mobile ads market share. This is more than triple its share from 2012 to 2013, and Facebook now generates 59% of its ad revenue from mobile.[105] The increased ads revenue provides financial resources for Facebook to expand its mobile properties through acquisitions. Facebook acquired photo and video sharing service Instagram for $1 billion in 2000. Before being acquired by Facebook, Instagram was running on Amazon's cloud computing service, but soon moved to Facebook's data center. Facebook claimed it would keep Instagram's 20 billion-strong user data separate from Facebook data to protect the privacy of Instagram users. Yet, soon after its migration, Facebook changed its privacy policy to share data between Instagram and Facebook. It has already begun to display ads on Instagram, and is building its mobile brand advertising campaign platform. In 2014, the company also acquired the messaging app *WhatsApp* for $19 billion*,* which had 450 million users, and added 50 million users in the first few months after its Facebook acquisition.[106]

Facebook released its own ads network *Audience Network*, putting it into competition with Google and Apple, and deployed a new Web profiling tool to gather

[104] "With Facebook IPO, time to friend privacy," *Christian Monitor,* February 1, 2012, http://www.csmonitor.com/Commentary/the-monitors-view/2012/0201/With-Facebook-IPO-time-to-friend-privacy.
[105] Austin Carr and Mark Wilson, "Facebook's plan to own your phone," *Fast Company*, 2014, Jun 17, 2014, http://www.fastcompany.com/3031237/facebook-everywhere.
[106] Ibid.

Web surfing data on users for advertisers. Ads on Facebook were usually based on users' own activity data and interests listed in personal profiles within the social media network, but now it is more far reaching and aggressive in user data collection including users' PCs and phone surfing data. Facebook even refused to honor the do-not-track setting on Web browsers, reasoning that there is no industry consensus. Social-media competitors Twitter and Pinterest have kept the do-not-track setting while Google and Yahoo! have not.[107] Advertisers still consider users' search data as the closest link between a consumer and actual sales. Facebook is trying to provide to advertisers the evidence that its new Web tracking tool is effective, and helps move Facebook users toward actual purchases.

Google's competition in the mobile space does not just come from Facebook and Apple. Ironically it also comes from its main Android manufacturer Samsung, which makes 65 percent of Android devices.[108] Google's original strategy for open source OS was to rely on a number of different hardware companies to distribute Android and avoid one company getting too big. But since Samsung is now selling the majority of Android phones, Google could simply lose control over the mobile market if Samsung leverages its market power against Google. Samsung recognizes that its devices are delivering more consumers to Google and Google's ads revenue growth and the company is reevaluating its close links with Google and Android OS.[109] Samsung is experimenting to see if the company can ditch Android, and instead use its own OS. The company introduced its own mobile OS *Tizen* and has even started paying developers to write apps for it. So far,

[107] Jim Edward, "In a Further Humiliation to Microsoft, Facebook will not Honor 'Do Not Track' Signals on Internet Explorer," *Business Inside*, June 12, 2014, http://www.businessinsider.com/facebook-will-not-honor-do-not-track-2014-6.
[108] Patrick Seitz, "Samsung controls 65% of the Android device market," *Investors*, February 28, 2014, http://news.investors.com/technology-click/022814-691660-samsung-dominates-android-smartphone-market.htm.
[109] Tim Bajarin, "The Next Major Industry Battle: Samsung Vs. Google," *PC Magazine*, November 25, 2013, http://www.pcmag.com/article2/0,2817,2427504,00.asp.

Google has been able to maintain its control over device manufacturers by closely controlling its own closed-source Google apps platform.[110] Android is free, but Gmail, Play, and Maps can only be obtained through Google's stringent and complicated approval processes. Google can exercise its power to reject services in Android that compromise its self-interest. For example when the mobile location service *Skyhook* was chosen to be the provider of location to pre-Google owned Motorola and Samsung Android phones, Samsung was forced to dump Skyhook mobile location service and to use Google's own system instead. Yet, Samsung's strong market share in mobile devices could shift the future direction of the Android "ecosystem" and weaken Google's control over Android phone.

Google's acquisition of Motorola Mobility for $12.5 billion in 2012 – which makes Android-based smartphones and tablets – was a way to prevent hardware manufacturers like Samsung having too much control over Android.[111] Yet, the acquisition did not turn out as Google had expected and Google sold Motorola Mobility to the Chinese firm Lenovo less than a year later – with Google keeping the majority of Motorola's patents. Giving up on its mobile phone manufacturing business has forced Google to strengthen its partnership with Samsung for now. Recently, the two companies struck a licensing deal that allows them to share key patents – an indication of their continuing alliance.

Meanwhile, Samsung's increasing market power has also been a threat to Google's and Samsung's competitor Apple, which has sued Samsung for patent infringement on several occasions. As the competition within the Internet industry intensifies, patents

[110] Ryan Whitwam, "Samsung has Android under its heel, and there's nothing Google can do about it," *Extreme Tech*, March 20, 2013, http://www.extremetech.com/computing/151140-samsung-has-android-under-its-heel-and-theres-nothing-google-can-do-about-it.
[111] Amir Efrati, "Samsung Sparks Anxiety at Google," *Wall Street Journal,* February 25, 2013, http://online.wsj.com/news/articles/SB10001424127887323699704578324220017879796.

have been increasingly used to monopolize power to shift market dynamics. Perversely, the ongoing patent lawsuit between Samsung and Apple is considered to be Google's proxy war against Apple.[112] In 2012, Apple argued that Samsung had copied its designs of the iPhone and iPad and the court found Samsung guilty of infringing on Apple's design patents for smartphones, but not for tablets. In a second law suit, Apple alleged that Samsung had sold phones and tablets violating five of its mobile software patents while Samsung alleged that Apple had violated two patents related to photo albums and videoconferencing.[113] Tellingly, the majority of Apple's patent-infringement claims against Samsung were related to Android functions on its Android-based Galaxy S5.[114] That meant that if Apple had won, Google would have had to make changes to those Android features that Apple claimed to be patent infringements and Samsung and other Android phone makers might have had to modify their phone software as well. Thus, Google had a significant stake on this legal case between Apple and Samsung, and Google engineers went so far as to take the stand to testify in Samsung's defense. In fact, Google has Mobile Application Distribution Agreements with all Android vendors promising technical support, and other assistance to partners facing lawsuits.[115] The court found Samsung guilty of infringing on two other Apple patents, and awarded Apple just

[112] David Kravets, "Who Cheated? Apple v. Samsung Patent Showdown Explained," *Wired,* July 27, 2012, www.wired.com/2012/07/apple-v-samsung-explained/; Victor Luckerson, "Definitive Proof the Apple vs. SamSung Case is Really About Google," *Times*, April 23, 2014, times.com/73902/apple-samsung-patent-case-involves-google.
[113] Brian Chen, "Mixed Verdict in Apple-Samsung Patent Fight," *New York Times,* May 2, 2014, http://www.nytimes.com/2014/05/03/technology/jury-finds-apple-and-samsung-infringed-patents.html?_r=0.
[114] Joel Rosenblatt, "Apple-Samsung $2 Billion Patent Case Over Google Near End," *Bloomberg New*, 2014, April 28, 2014, http://www.bloomberg.com/news/2014-04-28/apple-samsung-2-billion-patent-case-over-google-hits-last-round.html.
[115] Shara Tibken, "Google agreed to pony up for Samsung's defense against Apple," *CNET*, April 22, 2014, http://www.cnet.com/news/google-agreed-to-pony-up-for-samsungs-defense-against-apples-patent-infringement-claims/.

$119.6 million – only 5.5 percent of the $2.2B that Apple had demanded. This was considered a partial victory for Samsung as well as for Google.

In this brutally competitive mobile market, Amazon jumped in with the Fire Phone, which runs its own Fire OS. The OS is modified (forked) so that it doesn't include any of the popular Google apps like Play Store, Gmail, or Google Maps; instead, it is loaded with Amazon's app store, cloud storage, streaming video content, and, streaming music service.[116] One of Firefly's distinctive features is a barcode scanner and product-recognition app, which allows users to identify and compare prices of more than 70 million products and order them direct from Amazon.[117] Firefly is at the core of why Amazon released its smartphone[118] to defend and expand its core retail business into the mobile space.[119] The Fire Phone seems to have failed as of September, 2014 – Amazon recently dropped the price to $.99 – but this should be seen only as a setback as Amazon will no doubt continue its attempts to push into the mobile market.

While competition over the mobile space has been intensifying among major Internet firms from multiple fronts, capital is concurrently extending its mobile business by building and deploying cloud infrastructures, which provide computing resources to data-limited mobile devices.

To the Cloud

The combination of mobile devices and the Internet provides capital a giant step toward marketplace ubiquity; however, there are technical barriers. Mobile devices have

[116] Tony Bradley, "Why The Amazon Fire Phone Could Be A Smartphone Game Changer," *Forbes*, July 2, 2014, http://www.forbes.com/sites/tonybradley/2014/07/02/why-the-amazon-fire-phone-could-be-a-smartphone-game-changer/.
[117] Nick Statt, "Firefly is the Amazon Fire Phone's secret weapon." *CNET,* June 18, 2014, http://www.cnet.com/news/firefly-is-the-amazon-fire-phone-secret-weapon/.
[118] Ibid.
[119] Matthew Yglesias, "The big problem with Amazon's new phone — it's too good," *Vox*, June 19, 2013, http://www.vox.com/2014/6/19/5823814/the-big-problem-with-amazons-new-phone-its-too-good.

limitations in terms of processing power, battery life and data storage to live with users so it is difficult to emulate all of the critical PC functions. Capital's solution for these technical constraints is deploying cloud computing where both the data storage and the data processing happen outside of the mobile device. As centralized servers perform computing-intensive tasks and store massive amounts of data, mobile devices can be turned into data terminals rather than standalone machines.

Google's profit-making mechanism for the mobile space goes hand in hand with its cloud computing which allows for Google to transfer its services to mobile devices since the applications do not reside on the devices, but on Google's servers. In 2010 during his first keynote address at the Mobile World Congress, Eric Schmidt announced Google's mobile first strategy and said, "If you don't use the power of the cloud you will fail."[120] Google built its Android based on cloud services for many of its features. Deploying cloud computing in parallel with mobile devices is a way for Google to extend the full spectrum of its business beyond PCs.

In response, Apple has scrambled to integrate cloud features into its mobile business. Apple's urgency resonated in an email from then-Apple CEO Steve Jobs in 2010 as the company had fallen behind its competitors in cloud services. Jobs sent out an email to the company urging Apple to get on the leading edge of this trend to "further lock customers into our ecosystem."[121] Jobs even publicly announced that the Mac is

[120] "Google embraces mobile, makes announcements," *Mobile Word Live,* February 18, 2010. http://www.mobileworldlive.com/google-embraces-mobile-makes-announcements.
[121] Brad Reed, "How Apple blew its shot to rule the cloud," *BRG*, May 13, 2013, http://bgr.com/2014/05/13/apple-icloud-vs-google-vs-microsoft/.

merely another device, and said, "We're going to demote the PC and the Mac to just be a device. We're going to move your hub, the center of your digital life, into the cloud."[122]

When Apple launched its cloud business iCloud, it was already late in the game. iCloud worked as more of a backup system within Apple's closed ecosystem, yet it had neither a comprehensive online storage service nor email service to compete with Google or Microsoft.[123] Apple has FaceTime video chat, but it's only available to iOS users and doesn't have cross-platform services in the same way that Google and Microsoft do.[124] Apple's iTunes has been one of its most profitable cross-platform businesses, but now new popular music streaming services Pandora and Spotify are pulling users away from iTunes.[125] Apple recently decided to buy Beats Music and Beats Electronics for $3.2 billion, not for its famous hip-hop headphones, but for the fact that it could provide its own cloud-based music streaming service.[126] Apple has forged a partnership with IBM that gives Apple inroads into enterprise cloud services while giving IBM access to popular devices and more leverage to compete with other cloud businesses. As long as Google's Android remains the main competitor, Apple will face intense pressure to have an array of cloud services as its Mac-PC sales slow down and users increasingly shift to mobile devices.

While cloud computing is utilized by capital to extend mobile Internet business, it is also becoming a key source of profit for the Internet industry as a whole and promoted by information industries and governments, brushing off labor, environmental, security

[122] Sean Ludwig, "Google vs. Apple - Two Views of the Consumer Cloud," *Venture Beat*, October 28, 2011, http://venturebeat.com/2011/10/28/icloud-steve-jobs-legacy/.
[123] Reed, "How Apple blew its shot to rule the cloud."
[124] Ibid.
[125] Ibid.
[126] Ibid.

and privacy issues.[127] Cloud business is generally categorized into three different types. First is infrastructure as a service (IaaS) where a service provider offers computer resources including processor, storage, operating system, applications and network capability. Second is Platform as a Service (PaaS) where a service provider offers more than infrastructure, providing a set of application software that allows for a developer to build an application to run in their cloud. Third is software as a service (SaaS) where a service provider centrally hosts software and delivers to consumers on a subscription basis. Each category of services is a market for Internet firms, which are engaged more or less on all levels.

In particular, the Internet industry is aiming at business users for cloud computing services, promoting it as a way to increase productivity and decrease costs by leveraging and automating corporate technical infrastructure. In 2014, global business spending for infrastructure and services related to the cloud is expected to reach an estimated $174.2 billion. And by 2017, enterprise spending on cloud computing will balloon to $235.1 billion, triple the $78.2 billion spent in 2011.[128]

Google is eager to take a piece of this growing market, and it is already enticing app developers and corporations to shift to renting their IT infrastructure from Google with its mega-data storage and computing power. As the company enters more deeply into the cloud space, Google is facing off with Amazon, which has built strongly positioned cloud services.

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[127] Vincent Mosco, *To the Cloud: Big Data In a Turbulent World* (Boulder, Colorado: Paradigm Publishers, 2014), 123-174.
[128] "Cloud- Related Spending by Businesses to Triple from 2011 to 2017," *IHS inc*., February 14, 2014, http://press.ihs.com/press-release/design-supply-chain/cloud-related-spending-businesses-triple-2011-2017.

In 2006, Amazon launched its cloud computing platform Amazon Web Service (AWS), and currently has between 80% to 85% of the cloud market share in terms of providing platform as a service (PaaS). In PaaS, Amazon rents hardware, operating systems, server-software, storage, and network infrastructure over the Internet as a service to developers and business. Internet users may not be familiar with AWS, but they are using its service as they watch movies on Netflix, book rooms on Airbnb, stream music via Spotify, and click through Pinterest.[129] Amazon has been selling its data storage and processing power to companies around the world like Netflix and Shell, Fortune 500 companies including Unilever and GE, as well as to government agencies like the CIA and the US Navy.[130] For years, AWS has been the leader in enterprise cloud computing.[131] Amazon's cloud business generated an estimated $3.2 billion in revenue in 2013, and Amazon expects it to one day become even bigger than its core retail operation.[132]

Google is trying to catch up to Amazon, and it is a threat to Amazon. For Google, cloud computing is not new territory. Google's most popular products like search, Gmail, Google Docs, Google Maps, Google calendar, Google now, Google drive etc. are all running on Google's infrastructure where users' information activity data are stored and managed. All along Google has been running the biggest cloud-computing operation in the world – but just with a different purpose.[133] Google is already flexing its muscles in

[129] Kevin Roose, "What Happens When Amazon and Google Start a Price War Over the Future of the Internet?" *New York Magazine*, March 30, 2014, http://nymag.com/daily/intelligencer/2014/03/what-happens-when-amazon-and-google-go-to-war.html.
[130] Ibid.
[131] Christopher Mims, "Amazon and Google are in an epic battle to dominate the cloud—and Amazon may already have won," *Quartz,* April 16, 2014, http://qz.com/196819/how-amazon-beat-google-attempt-to-dominate-the-cloud-before-it-even-got-started/#/h/61692,3/.
[132] Roose, "What Happens When Amazon."
[133] Ibid.

consumer cloud storage business with Google Drive by offering larger amounts of free storage space than its competitors. Google's strategy has been consistent – free to control. Google, aiming to increase its user base, raised the free limit from 5GB to 15GB compared to 2GB for Dropbox and 10GB for Box respectively. In June 2014, Apple also unveiled its new cloud-based storage system called iCloud Drive similar to Dropbox; but iCloud only offers 5GB of free storage. The more data you upload to the Google cloud, the less chance that users will want to move to another cloud service. Jeffrey Mann, Vice President for research at Gartner said, "storage is where the stickiness is" and "It's how they hold a customer. If they store your stuff, they get to know you better."[134] In 2013, Google disclosed that there were 120 million Google Drive accounts.[135]

Building on its consumer cloud services, Google packages a host of enterprise cloud services (Google Apps) and sells them as Software as a Service (SaaS) to corporations, government and educational institutions and is actively trying to gobble up the enterprise business. Google Apps consists of cloud applications for document writing, collaboration, text and video, so that no one ever needs to install software on their own machines. It is a direct attack on Microsoft's office products that has long commanded the enterprise market – and caused Microsoft to recently form a partnership with Dropbox.[136] As of 2013, there are over 5 million organizations on Google Apps with 50

[134] Quentin Hardy, "Google, Microsoft and Others Delve Deeper Into Cloud Storage for Businesses," *New York Times*, June 25, 2014, http://www.nytimes.com/2014/06/26/technology/google-microsoft-and-others-delve-deeper-into-cloud-storage-for-businesses.html?_r=1.
[135] Adrian Covert, "Will Google Docs kill off Microsoft Office?" *CNN,* November 13, 2013, http://money.cnn.com/2013/11/13/technology/enterprise/microsoft-office-google-docs/.
[136] Tom Warren, "Dropbox and Microsoft form surprise partnership for Office integration," *The Verge*, November 4, 2014, http://www.theverge.com/2014/11/4/7153975/dropbox-microsoft-partnership-microsoft-office.

million users.[137] Google is gradually making inroads in the cloud-based enterprise market as Google Apps has grown from 10 percent of the cloud-office market in 2007 to 50 percent in 2012.[138]

In particular, Google has long been aiming at one of the largest organizations in the enterprise market – the US federal government. While corporations had been hesitant to move their IT operations to the cloud, the US government became a leading cheerleader in stimulating cloud computing and generating demand. The US government has been facilitating the expansion of cloud computing by mandating the implementation of cloud computing for federal agencies. The Obama Administration launched its "Cloud First Policy" to shift federal IT infrastructure into cloud computing and endorsed cloud computing in its 2010 budget request.[139] According to the market research firm MarketsandMarkets, government agencies will invest $18.48 billion dollars in cloud computing by 2018.[140]

In 2010, Google won a major US General Services Administration (GSA) contract to provide Google Apps including Gmail for the entire agency. Since then, Google has scored 23 out of 42 US government contracts to adopt Google Apps compared to 10 for Microsoft.[141] Microsoft quickly countered Google with its own cloud-based enterprise Office 365 suite, which is a hybrid cloud and conventional server service. Microsoft is

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[137] "47 Stats You Need to Know About the Google Apps Ecosystem," *Better Cloud Blog*, October 23, 2013, http://blog.bettercloud.com/google-apps-stats/.
[138] Ibid.
[139] Doug Beizer, "Obama's cloud initiative. The Business of Federal Technology," *Federal Computer Week*, May 15, 2009, http://fcw.com/articles/2009/05/18/news-obama-in-the-cloud.aspx.
[140] Saroj Kar, "Government Sector will Invest $18.48 Billion by 2018 in Cloud Computing," *Cloud Times,* January 2, 2014, http://cloudtimes.org/2014/01/01/government-sector-will-invest-18-48-billion-by-2018-in-cloud-computing/.
[141] "The Office 365 vs. Google Apps Battle: Who Will Dominate Enterprise Software?" *Cloud Tweak*, February 19, 2013, http://cloudtweaks.com/2013/02/the-office-365-vs-google-apps-battle-who-will-dominate-enterprise-software/.

still the largest player and claims that its Office suite is installed on more than 1 billion machines,[142] but Google Apps is trying to swallow up the enterprise market by becoming the standard for tech startups, small businesses and newer large companies.

To further extend into the cloud market, Google is now going after app developers to draw them into Google's infrastructure by launching a host of cloud services including *Platform as a service (PaaS)* and *Infrastructure as a service (IaaS)* on Google's infrastructure. Google and Amazon are certainly not the only players in this space. Windows Azure cloud, AT&T, Verizon, Rackspace, IBM, Cisco, Virtustream, GoGrid, and Softlayer are all throwing their hats into the cloud ring and a host of smaller web-hosting companies are also offering various cloud services as well.[143] As the cloud war has heated up, Google kicked off the price war to expand its user base by slashing prices as much as 90% for some of its "Compute Engine" cloud computing facilities which has pressured its competitors Microsoft and Amazon to cut their prices as well.[144] Compute engines allow developers to build faster services by having their data and virtual servers in proximity. Compute engines are generally divided into geographic zones that map close to data centers. To attract more developers, Google has recently offered 2 new Compute Engine zones in the US and Asia-Pacific markets. However, they still trail Amazon and Microsoft. Amazon offers three different cloud-based enterprise zones in the US alone, has data centers in Ireland, Frankfurt, Singapore, Tokyo, Sydney, Sao Paulo

[142] Adrian Covert, "Will Google Docs kill off Microsoft Office?" *CNN,* November 13, 2013, http://money.cnn.com/2013/11/13/technology/enterprise/microsoft-office-google-docs.
[143] Reuven Cohen, "Google Announces Cloud Infrastructure Service: Google Compute Engine," *Forbes*, July 28, 2012, http://www.forbes.com/sites/reuvencohen/2012/06/28/google-announces-google-compute-engine-iaas/.
[144] Tiernan Ray, "Google Cuts Cloud Prices, Rackspace Sinks, Amazon Slips; Battle Heating Up, Says Baird," *Barrons,* December 3, 2013, http://blogs.barrons.com/techtraderdaily/2013/12/03/google-cuts-cloud-prices-rackspace-sinks-amazon-slips-battle-heating-up-says-baird/.

and Beijing.[145] Microsoft currently has thirteen different zones around the world, including six in the US.[146] The battle between and among these Internet giants is aimed at taking a bigger portion of the total corporate IT spending which will be worth almost $1.4 trillion in 2014.[147]

For years, Google did not consider cloud computing part of its core business, but now the company is looking to this space as a major source of profit. Urs Hölzle, a senior vice president of technical infrastructure at Google, in an interview with *Wired* magazine, said that the revenues from the cloud could exceed the revenue that the company generates from online advertising.[148] The resulting battle is set to be huge and protracted, and will give rise to conflict over controlling the Internet infrastructure itself.

Internal Infrastructure

This battle over the Internet can be seen in the physical infrastructure of the Internet firms. Since its Internet services hinge on networks, Google has overseen a massive build-out of its Internet infrastructure. By 2013, Google had invested about $23 billion in data centers which all require high-capacity backbones to transport data quickly and efficiently.[149] The company invested $2.35 billion on infrastructure in the first quarter of 2014 alone, increased from $2.26 billion in the previous year's fourth quarter and almost

[145] Frederic Lardinois, "Google Compute Engine Adds New Zones In US And Asia," *Tech Crunch*, August 5, 2014, http://techcrunch.com/2014/08/05/google-compute-engine-adds-new-zones-in-us-and-asia/; Amazon Web Services, "Products and Services by Region," Amazon Web Service, https://aws.amazon.com/about-aws/global-infrastructure/regional-product-services/.
[146] Lardinois, "Google Compute Engine."
[147] Christopher Mims, "Amazon and Google are in an epic battle to dominate the cloud—and Amazon may already have won," *Quartz*, April 16, 2014, http://qz.com/196819/how-amazon-beat-google-attempt-to-dominate-the-cloud-before-it-even-got-started.
[148] Cade Metz, "Google's Bold Plan to Overthrow Amazon as King of the Cloud," *Wired,* March 24, 2014, http://www.wired.com/2014/03/urs-google-story/.
[149] Gary Kim, "Does Google Want to Control More of the Internet Backbone?" *TechZone360*, December 17, 2013, http://www.techzone360.com/topics/techzone/articles/2013/12/17/363878-does-google-want-control-more-the-internet-backbone.htm.

double the $1.2 billion in the first quarter of 2013.[150] The majority of its capital investments have been for data centers, servers, networking equipment, and property. While it is invisible, Internet services rely on network infrastructure to compute and transfer massive amounts of data back and forth. Early on, Google understood the importance of network infrastructure in order for them to process the oceans of data that the company handles on a daily basis. Since 2005, Google has been acquiring "dark fiber," the unused underground cable left dormant by the dot-com crash of the late 1990s and early 2000s.[151] In 2007, Om Malik from GigaOM pointed out that Google builds its own network, data centers, servers and storage systems to deliver it services as fast and at the lowest cost possible. He said, "Google's gigantic infrastructure is the big barrier to entry for its rivals."[152]

Currently Google has 13 mega data centers, with 6 in the US and 7 across the globe – Taiwan, Singapore, Chile, Finland, Belgium, Ireland, and Netherlands – and an unknown number of collocation centers where Google rents data center space. Large-scale data centers – sometimes called "server farms" – are centralized facilities that primarily contain large numbers of servers and computer equipment used for data processing, data storage, and high-speed telecommunications. There is a growing arms race among leading Internet companies – Google, Microsoft, Amazon, Facebook etc. – in building out these global large-scale data centers. In all, Google supposedly operated

[150] Derrick Harris, "The price of being Webscale: Google spent $2.35B on infrastructure in Q1," *Gigaom,* April 17, 2014, http://gigaom.com/2014/04/17/the-price-of-being-Webscale-google-spent-2-34b-on-infrastructure-in-q1/.
[151] Dan Rowinski, "White Spaces & Dark Fiber: Internet Giants Angle For Control Of The Internet's Pipes," *Readwrite*, December 17, 2013, http://readwrite.com/2013/12/17/internet-backbone-google-amazon-facebook-microsoft; Sam Gustin, "Google Fiber Issues Public Challenge: Get Up To Speed!" *Time Magazine*, September 14, 2012, http://business.time.com/2012/09/14/with-google-fiber-search-giant-issues-public-challenge-get-up-to-speed/.
[152] Om Malik, "Google's Infrastructure is its Strategic Advantage," *Gigaom,* December 4, 2007, http://gigaom.com/2007/12/04/google-infrastructure/.

more than 1 million servers across its data centers in 2010 – more than 2% of all servers in the world.[153] By linking its numerous data centers together, Google operates one of the largest private Internet infrastructures. By 2010, Google had a much larger Internet infrastructure than Amazon or Microsoft and its global network was larger than all but one of the companies that provide the Internet backbone**.**[154] Today, Google owns and controls more than 100,000 miles of fiber optic cable globally – compare that to Sprint, one of the largest global network operators, which controls less than 40,000 miles.[155] According to Craig Labovitz, founder of cloud and network infrastructure company *Deepfield*, "more than 62 percent of the smartphones, laptops, video streamers, and other devices that tap into the Internet from throughout North America connect to Google at least once a day."[156] To handle its growth, and speed up its content delivery process, Google has added thousands of servers – called Google Global Cache servers – to Internet Service Providers (ISPs) around the world. These servers store the most popular content from Google's network and then serve it directly from the ISP's data center, rather than going through one of Google's own data centers.[157]

While it is building out its own network infrastructure for its internal operations, Google is also laying out ultrafast fiber optic networks to speed up the "last-mile" Internet for users. This seems outwardly to be an extremely generous gesture, but Google's motivation is its own corporate self-interest – the more people who have access

[153] "Google may own more than 2% of all servers in the world," *pingdom*, August 24, 2009, http://royal.pingdom.com/2009/08/24/google-may-own-more-than-2-of-all-servers-in-the-world/.
[154] Cade Metz, "Google's Bold Plan to Overthrow Amazon as King of the Cloud," *Wired*, March 24, 2014, http://www.wired.com/2014/03/urs-google-story/.
[155] Mike Elgan, "Rise of the GoogleNet," *Datamation*, December 18, 2013, http://www.datamation.com/networks/rise-of-the-googlenet.html.
[156] Robert McMillan, "Google Serves 25 Percent of North American Internet Traffic," *Wired,* July 22, 2013, http://www.wired.com/2013/07/google-internet-traffic/.
[157] Ibid.

to high-speed Internet, the more Google is queried**,** the more YouTube video is viewed, the more Google Hangout is used, etc. which all mean more Google revenues.[158]

In 2012, Google launched its Google Fiber project to provide Internet access to consumers at one GB per second which is 100 times faster than the average US broadband service for $70 a month (and 5 Mbps fiber for free). Initially, the company rolled out the service in Kansas City, KS and Austin, TX, – all subsidized by the municipalities themselves – but the company recently announced plans to launch Fiber in 34 cities. When Google Fiber was announced, many suspected that the idea behind Google's venture was to spur the telecom and cable industries to improve their broadband offerings, and enhance broadband speeds and penetration – all of which are necessary for Google to expand its wide ranging services that require fast and wide-spread broadband infrastructure to incentivize their adoption and use. Moreover, since Google Fiber is connected to users' homes, this offers another data collection point for Google to monitor users' information activities over the Internet.

Google fiber is fueling the broadband war. Google's initial goal is succeeding, given that telecommunications behemoth AT&T is investing in infrastructure and also expanding ultra fast fiber services in 21 major metropolitan areas. AT&T recently announced that it planned to challenge Google's Fiber initiative by expanding its own service to several important markets in the areas where Google is investing to build out its Google Fiber project. Whether or not Google will directly move into the ISP business still remains a question, but Google's Fiber project is a direct challenge to telecom giants

[158] Sam Gustin, "Google Is Making a Major Play to Provide Your Internet," *Time*, February 19, 2014, http://time.com/8958/google-fiber-expansion/.

like AT&T, Verizon and Comcast who have long battled over Internet services in an attempt to generate more profit out of their infrastructure.[159]

Moreover, to further Google's reach and connect geographically dispersed markets, Google is going literally underwater, participating in the building of several submarine cables – Unity, a Trans-Pacific submarine communication cable between Japan and US, and Southeast Asia-Japan Cable (SJC) system which connects China, Hong Kong, the Philippines, Singapore and Brunei with Japan and its link to transpacific fiber that goes through the US. Recently, Google announced that it is joining FASTER, a new trans-Pacific cable system that will connect Japan to two major West Coast cites in the US, with initial speeds of up to 60 Tb/s. The consortium building FASTER includes: China Mobile International, China Telecom Global, Global Transit, KDDI and SingTel with NEC as the system supplier. Google's vice president for its technical infrastructure Urs Hölzle wrote that FASTER would guarantee that Google's services and products are fast and reliable.[160]

By physically owning major fiber routes and not needing to rely on the telecom industry for Internet service, Google has more control over its services at various points, delivery of the whole spectrum of its services and products, and has built a giant barrier to entry for other companies. Dan Caruso, chief executive at Kayo Group – a company

[159] Dan Rowinski, "White Spaces & Dark Fiber: Internet Giants Angle For Control Of The Internet's Pipes," *Readwrite*, December 17, 2013, http://readwrite.com/2013/12/17/internet-backbone-google-amazon-facebook-microsoft#awesm=~oI26PAGHkgfsFa.
[160] Frederick Lardinois, "Google invests in $300M Submarine Cable to improve Connection Between Japan and The US," *Tech Crunch*, August 11, 2014, http://techcrunch.com/2014/08/11/google-invests-in-300m-submarine-cable-to-improve-connection-between-japan-and-the-us/.

that sells fiber lines to companies – explains that "the move by the tech giants to own Internet infrastructure is really about controlling their own destiny."[161]

Internet as life itself

Backed by this massive network infrastructure, Google has taken up its profit-making business even beyond these familiar Internet sectors. By introducing Internet connectivity and Internet technologies into existing industries, Google and the other Internet firms are restructuring and to some extent absorbing them into their profit domain. The company is setting a trend as it weaves itself into major industrial and service industries including automobiles, manufacturing, energy, home electronics, health care, education, wearables and robotics.

Case in point: Google ambitiously delved into the automobile industry – one of the largest industrial sectors which revived capitalism from the Great Depression – and is reorganizing the industry to center it around information technologies. At the 2014 Automotive World annual conference in Dearborn, Michigan, the head of Google's global automotive unit Meredith Guerriero – not someone from GM or Ford – was the keynote speaker. She wooed the audience, speaking about fuel economy, eMobility and connected vehicles. Google is pursuing multiple fronts of the automobile sector to be extensions of its Internet business.

Since 2009, Google has been working on the self-driving car as part of Google X, the company's semisecret R&D lab for long-term initiatives.[162] This seemed to be one of Google's moon-shot projects even a few years ago, but it is attempting to figure out ways

[161] Tim Schiesser, Facebook and Google are buying Internet cables, controlling infrastructure, *Techspot,* December 17, 2013, http://www.techspot.com/news/55046-facebook-and-google-are-buying-internet-cables-controlling-infrastructure.html.
[162] Wikipedia, "Autonomous car," last modified, November 3, 2014, http://en.wikipedia.org/wiki/Autonomous_car.

to commercialize new technologies. Google is talking to auto manufacturers to bring down costs and produce for the mass market, but as it did with the Android operating system, Google is considering whether to license its technologies to automakers and have the automakers then produce them.[163] All of the major carmakers and automotive suppliers are working on their own driverless technologies as well; so if Google pushes its own self-driving car, GM product-development chief Mark Reuss asserts that this would be a "serious competitive threat" to the auto industry.

Moving the self-driving car into the commercial realm does not merely have technical- and scale issues, but there are also regulatory and legislative obstacles for Google to overcome. So far there are no concrete legal regulations around self-driving cars, which are considered neither legal nor illegal in a majority of states. Using this ambiguous legal space, Google was able to conduct more than 100,000 miles of test drives of its self-driving car before its official announcement of the project in 2010.[164] However, to further pursue the self-driving car business, Google first needed the government's help to legalize the self-driving car on the highway, and early on Google brought the government to its side. Google's lobbying machine has been taking on one state at a time to legalize the driverless car. As of the end of 2013, four States – Nevada, Florida, California, and Michigan – along with the District of Columbia had done so. In California, despite opposition from the Alliance of Automobile Manufacturers, the leading advocacy group for the auto industry, which includes 12 top auto makers such as

[163] Eric Blattberg, "Self-driving cars from Ford, GM, & others? Yes, if Google-automaker talks go well," *Venture Beat*, May 14, 2014, http://venturebeat.com/2014/05/14/self-driving-cars-from-ford-gm-others-yes-if-google-automaker-talks-go-well/.
[164] Amir Efrati, "Google's Driverless Car Draws Political Power," *Wall Street Journal*, October 12, 2012, http://online.wsj.com/news/articles/SB10000872396390443493304578034822744854696.

GM, BMW and Toyota, Google won by turning an autonomous-vehicle bill into law.[165] Google is slowly paving its own way for its future potential source of profit-making.

Besides ambition to build its own car, Google is integrating Android into automobiles to further the Android market beyond smartphones and tablets. The company created the Open Automotive Alliance (OAA) – similar to its Open Mobile Alliance – as a group of automotive manufacturers and technology companies aimed at using Android in automobiles. It is the same tactic in the automobile industry, as Google has used for its smartphone, integrating Android software into automobiles manufactured by various automakers including Toyota, General Motors etc. In this way, Google could grab a large part of a growing automobile business without manufacturing actual cars in a capital-intensive sector. At the same time, the auto industry is closely watching Google's strategies and intensions as it seeks to protect its territory of profit.[166]

Apple has not been on the sidelines while Google has pursued the Internet car. Before Google, Apple had introduced CarPlay – an infotainment system for automobiles. CarPlay can sync a driver's iPhone with a built-in dashboard featuring Siri voice control. In 2014, Apple's CarPlay will deploy in select cars from Ferrari, Mercedes-Benz, Volvo, BMV, Jaguar, Hyundai etc. and is expected to reach more than 24 million vehicles by 2016.[167] Microsoft's Nokia has also jumped in, developing auto technologies through its

[165] Ibid.
[166] Alexei Oreskovic and Ben Klayman, "Google, Detroit diverge on road map for self-driving cars," *Reuters*, http://www.reuters.com/article/2014/06/30/us-google-detroit-insight-idUSKBN0F50C320140630.
[167] Sam Oliver, "Apple's CarPlay could be in more than 24 million vehicles by 2019," *appleinsider*, July 10, 2014, http://appleinsider.com/articles/14/07/10/apples-carplay-could-be-in-more-than-24-million-vehicles-by-2019-report-says.

venture capital arm Nokia Growth Partner, which manages $700 million for development.[168]

Meanwhile, Google is also swiftly linking its automobile business to the start-up company Uber to enhance its strategic accumulation options. Uber – one of the most popular ride-sharing networks – is financed by Google and Goldman Sachs, and relies on its mobile app to fetch customers. Uber doesn't own or manage any cars, but simply deploys its app as the basis of its business. Drivers supply their own cars and pay Uber a 20% commission on each fare in exchange for the use of Uber's app and technical infrastructure. Under "flexible" options, Uber deploys a massive network of thousands of precarious workers who are potentially disposable at any time. Google's involvement in Uber's business seems a random venture to experiment with a new market; but it is part of Google's long-term profit-making strategy by linking up with a transportation network that can deploy Google's self-driving car. Uber chief Travis Kalanick has already alluded to that possibility and said, "driverless cars are the future and drivers are not." When Google's self-driving technology is ready, Google will have an infrastructure where Google simply can replace Ubers' drivers with Google's self-driving cars.

Google's self-driving car is merely a glimpse of its wider deployment of robotics across a range of sectors. Google acquired eight robotics companies including Boston Dynamics, an engineering and robotic design company that has fashioned mobile research robots for the Pentagon, and set up a new robotics team.[169] While Google has remained quiet about its plans, these acquisitions are part of Google's much larger move

[168] Adam Ewing, "Nokia Joins Musk to Google in Investing in Intelligent Cars (2)," *Business Week*, March 5, 2014, http://www.businessweek.com/news/2014-05-04/nokia-joins-musk-to-google-in-investing-in-intelligent-vehicles.
[169] Lorraine Luk, "Foxconn Is Quietly Working With Google on Robotics," *Wall Street Journal,* February 1, 2014, http://blogs.wsj.com/digits/2014/02/11/foxconn-working-with-google-on-robotics/.

into robotics and artificial intelligence that can be applied in a range of industries. While Foxconn – the world's largest contract electronics maker – is known as Apple's supplier, Google is now working with Foxconn and its robotic team, headed by former Android executive Andy Rubin, to develop new manufacturing technologies to further automate the factory floor.[170] This at a time when Foxconn is repressing workers who are demanding better working conditions and resisting against harsh exploitative labor practices. Google is assisting Foxconn as they face intense international criticism to replace workers with thousands of robots.[171] Google's partnership with Foxconn is signaling that the company is looking for expansion of its business in the manufacturing industry where it can appropriate internet technologies to reorganize labor processes and further the mechanization and automation processes. The US government is already on Google's side as the Obama administration has been pushing aggressively to create "digital manufacturing cities" and mobilizing the academic industrial complex to focus on "high-tech" manufacturing design technologies.

Digital capital's expansionary impulse is also moving into peoples' homes, re-altering them into a new marketplace. Google acquired Nest Labs, a home automation company and maker of high-tech thermostats and smoke detectors – as well as Nest's large amount of private data on home energy use, temperature etc. – to expand its presence in consumers' homes as it marches into the so-called "smart home" market over rivals such as Apple, Microsoft, Samsung, and IBM.[172] Nest is part of a broader Google

[170] Ibid.
[171] Grant Brunner, "Foxconn is attempting to replace its human workers with thousands of robots," *Extreme Tech*, July 8, 2014, http://www.extremetech.com/electronics/185960-foxconn-is-attempting-to-replace-its-human-workers-with-thousands-of-robots.
[172] Rolfe Winker, "What Google Gains From Nest Labs," *Wall Street Journal,* January 14, 2014, http://online.wsj.com/news/articles/SB10001424052702303819704579321043556056678.

play in home entertainment as it expands its Chromecast device for streaming online content to televisions. Google is seeking end-to-end control from fiber going from the garage into the house, through the living room and kitchen, with links to Android powered automated systems with cloud data services.[173] To this end, Google has appropriated Nest's hardware unit, building hardware/software rather than operating systems for others to apply.[174] Armed with a vast number of patents from its Motorola Mobility acquisition, Google is building its hardware team to embed Android into homes and enable devices such as locks, doorbells, baby monitors and humidity monitors. Google's Nest Labs unit has already purchased Dropcam Inc., a video-monitoring and security firm, for $555 million, aiming for Android to become the dominant operating system for home and wearable devices.[175] John Gapper from the *Financial Times*[176] equated Google to General Electric (GE) in the late 19th century when GE promoted futuristic homes with a range of home appliances and technologies as a way to expand its marketplace into homes. Today it's not GE but Internet firms that are reentering into homes and reorganizing them into an emergent profit domain. Google's competitor Apple has already intervened in the home by selling a platform HomeKit, allowing people to use their iPhones to control their houses. Samsung declared that the "smart" home is a

[173] Ibid.
[174] Rory Carroll, "Google buys Nest Labs for $3.2bn in bid for smart home-devices market," *Guardian*, January 14, 2014, http://www.theguardian.com/technology/2014/jan/13/google-nest-labs-3bn-bid-smart-home-devices-market.
[175] Alistaor Barr and Rolfe Winker, "Google's Nest to Buy Dropcam for $555 Million," *Wall Street Journal,* June 20, 2014, http://online.wsj.com/articles/googles-nest-labs-to-buy-video-monitoring-security-startup-1403308929.
[176] John Gapper, "Google is the General Electric of the 21st century," *Financial Times,* June 5, 2013, http://www.ft.com/intl/cms/s/0/e57abef0-cd0c-11e2-90e8-00144feab7de.html?siteedition=intl#axzz35ZY1QLEB.

"growth engine" by launching its own open source OS Tizen to compete with Android and iOS.[177]

From automobile to home to museums and libraries, our everyday lives are no longer insulated from the market as digital capital is doing in other industries what it has already done by ravaging the fields of education and health – the most basic social domains that should be operated outside of commerce. Digital capital is going far beyond traditional computing devices, and is no longer limiting itself to smartphones and tablets. The Internet industry describes this as the "internet of things" which means powering and connecting billions of everyday objects to other objects and those objects to humans – and collecting all of that data. Google calls it "real life Internet."[178] Digital capital aims to engulf life itself.

This then is the scope of political economy of information industry within which search is situated. As demonstrated above, capital has a firm grip on the information sphere, so it's hard to imagine search services outside the market. However, the origin of search technology was rooted in the public institutions where search engines functioned as more like a public utility. How then did search engine technologies shift to the marketplace? The next chapter traces the evolution of search function, business models and its development of technical infrastructure. It documents how the search function has emerged as one of the most profitable industries from technologies that were mainly developed in the academic, non-commercial domain, and explicates the evolution of the

[177] Edward Baig, "Samsung's BK Yoon talks smart homes, appliances," *USA Today*, June 23, 2014**,** http://www.usatoday.com/story/tech/columnist/baig/2014/06/20/samsung-bk-yoon-talks-smart-homes-appliances/10665777/.
[178] Pankaj Mishra, "Google Is Making A Land Grab For The Internet Of Things. *Tech Crunch*, January 2, 2014, http://techcrunch.com/2014/01/27/google-is-making-a-land-grab-for-the-internet-of-things/.

business model and technical infrastructure behind search that are being organized to monetize user information activities – labor.

Chapter 2

Monetizing User Traffic: The Development of Search Advertising Systems

Initially, many search engine technologies were developed within noncommercial environments. Early pre-Web search engines were created in academic institutions. *Archie*, developed at McGill University in 1990, indexed files from FTP servers and is considered the Internet's first search engine. Following Archie, *Gopher* was developed at the University of Minnesota in 1991. It was both a protocol and application to transport hierarchically organized text files. *Gopher* was widely used in universities and libraries. The rise of Gopher led to new search software *Veronica* and *Jughead*. Veronica came about in 1992 at the University of Nevada, Reno to index information on gopher servers; Jughead, from the University of Utah in 1993, was an alternative to Archie, and also searched for files on gopher servers. Whereas Veronica listed all server titles that fit the search criteria, Jughead searched a single server at a time.

The first Web search engine – *WWW Wanderer* developed by Matthew Gray at MIT in 1993 – was also the first Web crawler, actually designed to measure the growth of the Web. It lasted until 1995. One of the first full-text crawler search engines was *Webcrawler* in 1994 – created by Brian Pinkerton at the University of Washington – which allowed users to search for words on Web pages. Webcrawler was bought by America Online in 1995 and later sold to Excite. Lycos from Carnegie Mellon, Inktomi from University of California Berkeley, and Excite, Yahoo! and Google from Stanford – were all created in academic research institutions, and most often with public funding. In particular, Google's algorithm PageRank was part of a Stanford Digital Library Project (SDLP), one of the first six awards of the multi-agency Digital Library Initiative (DLI)

financed by the National Science Foundation (NSF).[179] Larry Page and Sergey Brin, supported by an NSF Graduate Research Fellowship, developed the initial PageRank algorithm as they were working on the SDLP project. At that time, the primary goal of the SDLP project was described thusly, "to develop the enabling technologies for a single, integrated and 'universal' library, proving uniform access to the large number of emerging networked information sources and collections."[180] Not accidently, this is quite similar to Google's current mission – "to organize the world's information and make it universally accessible and useful."

Table 1. Search Engines/Directories between 1990 - 1995

Year	Search Engines/Directories
1990 (Pre Web)	Archie – McGill University
	Gopher – University of Minnesota
	Veronica – University of Nevada, Reno
	Jughead – University of Utah
1992	World Wide Web Virtual Library – CERN, Geneva, Switzerland
1993	
	World Wide Web Wanderer – MIT
	W3Catalog – University of Geneva
	AiWeb – Nextor
	JumpStation – University of Stirling,
	World Wide Web Worm – University of Colorado
	Yahoo! – Stanford University
1994	
	Web crawler – University of Washington
	Lycos – Carnegie Mellon University
	Infoseek – Steve Kirsch, Infoseek Corporation
1995	
	Open Text – University of Waterloo
	Magellan – Isabel & Christine Maxwell
	Excite – Stanford University
	AltaVista – Digital Equipment Corporation
	infoMarket Search – IBM

Source: Michael Zimmer (2007) & Van Couvering (2010)

[179] "On the Origins of Google National Science Foundation," National Science Foundation, August 14, 2004, http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=100660.
[180] "The Stanford Integrated Digital Library Project," National Science Foundation, http://www.nsf.gov/awardsearch/showAward?AWD_ID=9411306.

The emergence of a number of new search engines and Web directories that grew out of academic institutions was in response to the rapid growth of the Web. In 1991, there was one Website, but by 1995, the Web grew to 23,000 pages and Web users reached 44,838,900. By January 1997, a year before Google released its PageRank, the Web grew to 650,000 pages and Web users reached 120,758,310.[181] With a rapidly growing Web, search engine technology became a necessary utility to access information on the Internet. Given this necessity and growing scale, no longer could a few individuals build and manage a search engine, it soon required a large information infrastructure and investment. Combined with this, the function of the search engine as a gateway to information seemed to fall within the domain of public information provision. Libraries for instance, as existing public information infrastructure, early adopters of computers and key participants in early search engine development, could have built, with public funding, the public utility of search. With this in mind, the first question to ask must be: considering these initial search engine technology developments, which occurred outside of commercial transactions, how did search engine technologies shift from a public utility type of function to become billion dollar ads-based businesses?

Why did search engines not continue to be organized as public services when that was potentially their initial role? Search engine technologies made for uncertain businesses and few people predicted that search itself could be a business. Even major advertisers were skeptical about online ads as a viable market platform. The first Chief Financial Officer (CFO) of Lycos, Ted Philip recalled, "there was no such thing as advertising on the Internet at that time...We had no business plan. All we had was a piece

[181] Web Growth data from Matthew Gray, the creator of WWW Wanderer, the first Web crawler. http://www.mit.edu/people/mkgray/net/internet-growth-raw-data.html.

of technology."[182] In 2000, Yahoo! cofounder Jerry Yang echoed a similar sentiment in a *Forbes* Interview, saying that in 1994, he and his partner were working on the Yahoo! directory as a hobby. He said, "We were looking for another start-up idea. We really didn't think Yahoo! could possibly be it. There was no real business model that fit it." [183] Search engines did not have intrinsic commercial value; rather they had to be enabled and organized in a particular way.

Searching for a Business Model

Along with the privatization of the Internet, the rise of the search engine industry intersects with the dot-com bubble between 1995-2000 when large sums of venture capital fueled a host of Internet-based technology startups and when telecommunication and networking equipment companies attempted to organize the Internet as a commercial platform.[184] The Internet bubble emerged after the recession in the early 1990s following the stock market crash of 1987 as capital was seeking a new site of accumulation to overcome the economic down-turn.[185] In searching for a new high growth sector, massive amounts of financial capital flowed into Internet startups, which nurtured the Dot-com bubble. Goldfarb, Pfarrer, and Kirsch, in their 2005 study, estimated that from 1998-

[182] Elizabeth Van Couvering, "Search engine bias: the structuration of traffic on the World-Wide Web" (PhD diss., London School of Economics, 2010), 98; Giovanni Gavetti and Jan Rivkin, "On the Origin of Strategy: Action and Cognition over Time," *Organization Science*, 18, no. 3 (2007), 425.
[183] Brent Schlender, "The Customer Is The Decision-Maker Jerry Yang talks with FORTUNE's Brent Schlender about flexibility, hierarchy, and the "religion" of Yahoo," *Fortune*, March 6, 2000, http://archive.fortune.com/magazines/fortune/fortune_archive/2000/03/06/275281/index.htm.
[184] Sam Ro, "Venture Capital Funding Is Nowhere Near The Levels We Saw During The Dot-Com Bubble," *Business Insider*, April 10, 2014, http://www.businessinsider.com/historical-venture-capital-funding-2014-4.
[185] Robert McChesney, *Digital Disconnect: How Capitalism Is Turning the Internet Against Democracy* (New York: The New Press, 2013); Matt Crain, "The Revolution Will Be Commercialized: Finance, Public Policy, and the Construction of Internet Advertising" (PhD diss., University of Illinois, 2013); Dan Schiller, *Digital Capitalism*.

2002, 50,000 new ventures were formed in an effort to commercialize the Internet.[186] And these dot-com firms did not subscribe to traditional business models, rather they pursued intangible "mind share" or "eye balls" to build brand awareness while they were operating at a sustained loss.[187] A host of venture capital funded initial start-ups intended to leverage the "eyeballs" that had garnered to other advertisers and were trying to expand their consumer base as fast as possible to build brand in order to increase their valuation – the idea was to "get big fast."[188]

Search engine firms – once called eyeball aggregators – were at the center of this "get big fast" game.[189] In 1998, Robert David, CEO of Lycos, echoed this business model, "our sole focus is audience size … Any place there are consumers, there are advertisers."[190] In the 1990s, betting on this eyeballs game, a slew of major venture capital firms such as Sequoia Capital, Softbank, Kleiner Perkins Caufield & Buyers, Highland Capital Partners, Institutional Venture Partners (IVP), and Draper Fisher Juverton invested in search engine start ups like Yahoo!, Infoseek, Lycos, Excite, AltaVista, Ask Jeeves, Google, etc. Draper Fisher Juverton invested more than 30 million dollars in search services.[191] Timothy Draper, a managing partner with the venture capital firm, said "Search is going to be hot as long as people continue to be frustrated."[192] Draper Fisher Juverton was also one of the original US investors in Chinese search

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[186] Brent Goldfarb, Michale Pfarrer, and David Kirsch, "Searching for Ghosts: Business Survival, Unmeasured Entrepreneurial Activity and Private Equity Investment in the Dot-Com Era," Working Paper No. RHS-06-027 (Robert H. Smith School, 2005), 2, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=825687.
[187] Paul Anderson, *Web 2.0 and beyond: principles and technologies* (Boca Raton: CRC Press, 2012), 35.
[188] Crain, "The Revolution Will Be Commercialized," 113.
[189] Christopher Nerney, "The Up and Coming," *Network World*, April 20, 1998, 57-58.
[190] Ibid.
[191] Phil Carpenter, *EBrands: Building an Internet business at breakneck speed* (Boston: Harvard Business School Press, 2000), 197.
[192] Ibid.

engine Baidu which will be discussed in a later chapter. While looking for business models, search engine firms funded by venture capital spent the majority of their budgets in attracting lots of users to their sites because, without standard metrics for market share, Web metrics were centered around "traffic," "hits," and "eyeballs."

To build brand recognition and draw user traffic, search engine firms launched extensive marketing campaigns on and offline, and poured the majority of venture capital money into brand building and advertising campaigns. Running up to its IPO, Yahoo! spent $5 million for the first national-scale ad campaign on television.[193] This could be seen as a small amount of money for TV ads, but it was almost Yahoo!'s entire advertising budget for 1996.[194] PR was not neglected then. Yahoo!'s PR agency generated 600 articles in 6 months in business and trade journals as well as mainstream publications.[195] Shortly thereafter, Excite responded and launched its own $8 million nation-wide television campaign.[196] From 1995 – 1998, Excite poured more than $65 million into marketing to build its national brand.[197] Ironically, search engine firms were sellers of online ads at the same time being among the largest advertising spenders as well.

Along with extensive marketing, search engine firms built partnerships with established Internet businesses to draw more user traffic. After rejecting an offer to be acquired by Netscape and AOL, Yahoo! began a strategic partnership with Netscape, then the most valuable property on the Net, which made Yahoo! one of the featured search

[193] Ian Chaston, *Entrepreneurial management in small firms*. Los Angeles: SAGE, 2009), 67.
[194] Ibid.
[195] Karen Angel, *Inside Yahoo!: Reinvention and the road ahead* (New York: John Wiley & Sons, 2002), 39.
[196] Chaston, *Entrepreneurial management in Small firms*, 67.
[197] Carpenter, *EBrands*, 192.

engines for Netscape's browser users. Excite, then the number 2 search engine, made a strategic deal with Netscape, Microsoft and America Online (AOL), to expand the distribution of their search engine services.[198] Infoseek also made a deal with Netscape in which it became a featured search provider on Netscape.

Table 2. The Search Engine Market

Product	Entry Date	Unique Users in Millions		
		August 1997	August 1998	August 1999
Yahoo!	1994	14.8	26.0	33.0
Infoseek/Go Network	1995	7.9	12.5	18.5
Lycos	1994	4.9	12.0	14.9
Excite	1995	7.6	14.6	14.1
AltaVista	1995	4.7	9.5	9.2
Webcrawler	1995	3.2		
About	1996		--	8.6
LookSmart	1996		3.2	8.5
Snap	1997		4.0	8.3
HotBot	1996		5.5	7.2
GoTo	1998		2.6	7.1
Ask Jeeves	1997		0.4	4.0
Total # (in millions) of unique users		43.1	90.2	133.7
Total # (in millions) of web users		44.7	55.5	63.1

Source: Neil Gandal, "The dynamics of competition in the Internet search engine market," *International Journal of Industrial Organization,* 19, 1103-1117, (2001).

With extensive marketing campaigns, partnerships with other Internet firms and the increase in Web user population, leading search engines such as Yahoo!, Lycos, Infoseek, Excite, and AltaVista were able to draw millions of users by the late 1990s. And they all followed a textbook dot-com route: once big enough, companies pursued one of two lucrative exit strategies: 1) filed an IPO to raise more funding and to expose its brand; or 2) sold themselves to a bigger company without a solid business model.

[198] Rebecca Pirto Heath, "The Marketing 100: Excite: Scott Epstein," *Advertising Age*, June 20, 1997, http://adage.com/article/news/marketing-100-excite-scott-epstein/71587/.

The first search engine to go public was a Canadian company OpenText, which came out of research projects at the University of Waterloo.[199] By the end of 1996, the top four at the time – Yahoo!, Excite, Lycos, and Infoseek – all had IPO's and raised $162 million.[200] While many search engines went the IPO route and raised millions of dollars during the dot-com boom, none of them had a working business model. Going for IPO without a specific revenue source was not uncommon for dot-com start-ups that relied on the "get big fast" principle in which companies with little revenue sources raised massive amounts of capital by pursuing a strategy of attracting "eyeballs." By the mid 1990s, the major search engine firms had millions of users, but couldn't figure out ways to monetize those "eye balls."

In its IPO preparation, Yahoo!, then the leading search engine, was mulling over three possible revenue sources – licensing its directory, fee-based services, or advertising. Unlike other search engines, Yahoo! couldn't license its search engine software since it started with a human-edited directory and outsourced its search technology to other search engine firms. Despite advertising being one of its options as a revenue source, Yahoo! was not at all sure if the ads business model would be viable given there were no precedents for online ads sponsored businesses. The company was unsure whether the Web could ever drive enough advertising revenue, and even if it did, there were hundreds of dot-com sites that were chasing after the same advertising dollars.[201] Also, Yahoo! knew that users would not pay for its services when there were already plenty of free services available online. Tim Brady, Yahoo!'s marketing director argued that, "No one

[199] William Aspray and Paul Ceruzzi, *The Internet and American business* (Cambridge, Mass: MIT Press, 2008), 174.
[200] Angel, *Inside Yahoo!*, 124.
[201] Joan Rigdon, "Yahoo! IPO Soars in First Day, But Honeymoon May Not Last." *Wall Street Journal,* April 15, 1998, http://online.wsj.com/article/0,,SB849504268462964500,00.html.

pays for picking up the Yellow Pages…. I don't think it's going to happen online."[202] In the end, Yahoo! nonetheless went with its ads model because there was a surge of online ads demand from dot.com firms who wanted to build their brand quickly. Along with Yahoo!, the first generation of search engines like Excite and Lycos initially pursued advertising.

Search engines initially served banner ads, the main advertising format at that time. Banner ads were popularized by HotWired, the first commercial digital magazine on the Web and online version of Wired magazine, which first sold pictorial banners on Cost Per thousand Impressions (CPM) on a large scale in 1994.[203] CPM meant that when an "impression" or "hit" happened, a banner ad would be displayed. Since there was no specific pricing model for online ads, Web publishers used the CPM model, borrowing from the models of traditional print publications and other media. With the CPM pricing model, whether or not users recognized the ads or interacted with them made no difference as long as the ads were displayed in front of users' eyeballs. The CPM model offered no data on the actual effect of an advertisement. Thus, the major advertisers were hesitant to shift significant portions of their marketing budgets to a new platform that did not guarantee a Return On Investment (ROI). They were looking for more accountability and metrics from Web publishers, but there were no established standards or criteria for measuring Web audience. Fernando Bermejo, quoting a 1996 *Advertising Age* article, captured advertisers and marketers' uncertainty about these new ads platforms, stating:

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[202] Ken Yamada, "Yahoo soliciting advertisers for Internet directory service," *Computer Reseller News*, 642, Aug 7, 1995, 54.
[203] Frank D'Angelo, "Happy Birthday, Digital Advertising," *Advertising Age*, October 25, 2009, http://adage.com/article/digitalnext/happy-birthday-digital-advertising/139964/;
Chip Bayers, "The original Internet adman long before digital advertising was a multibillion-dollar industry, Jonathan Nelson saw the future," *AdWeek*, July 12, 2011, http://www.adweek.com/news/advertising-branding/original-internet-adman-133283.

> the lack of Internet standards is currently the single greatest impediment to the Web's emergence as a viable long-term advertising medium. The void impacts everything from definitions to audience measurement to ad sizes and pricing.[204]

In fact, advertisers pressured Web publishers to provide sophisticated audience measurements so they could see if ads were working and compare with traditional media programs.[205] At the same time, mainstream advertisers and marketers were hedging their bets, afraid that they would be left behind, so they were experimenting with the Internet as a new ads platform.[206]

In 1996, Proctor & Gamble (P&G) made the first move. Demanding more accountability from Yahoo!, P&G struck a deal with the search engine to pay for advertisements on a Cost Per Click (CPC) basis rather than CPM.[207] This meant that P&G paid only when a searcher actually clicked on an ad. Yahoo!, followed by search engine site LinkStar Communication, offered an option for CPC model. This opened a debate on how publishers should charge for ads and Web publishers were reluctant to adopt a CPC model.[208] AOL rejected the P&G deal because leveraging its place as the largest ISP at that time, AOL touted that it would be able to deliver user traffic in the millions.[209] Yet, the real reason for AOL's refusal to use the CPC model was its basic business calculation because it reasoned that the CPC model could reduce its revenue since it was only paid when someone clicked.

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[204] Scott Donaton, "Standards required to make next leap," *Advertising Age*, November 4, 1996, http://adage.com/article/news/standards-required-make-leap/235/; Fernando Bermejo, *The Internet Audience: Constitution & Measurement* (New York: Peter Lang, 2007), 183; Joseph Turow, *The Daily You: How the New Advertising Industry Is Defining Your Identity and Your Worth* (New Haven: Yale University Press, 2011), 61.
[205] Ibid.
[206] "Ready or not, The Electronic Mall is coming," *Business Week*, November 13, 1994, http://www.businessweek.com/stories/1994-11-13/ready-or-not-the-electronic-mall-is-coming.
[207] "Another engine takes ads by the click," *CNET*, May 22,1996, http://news.cnet.com/Another-engine-takes-ads-by-the-click/2100-1033_3-212736.html.
[208] Ibid.
[209] Turow, *The Daily You*, 51.

Along with AOL, other Web publishers denounced CPC, saying "we are not going to offer them a cost per click because we can't figure out a way to make it make sense to us."[210] The tension between marketers and publishers persisted, and major marketers claiming that they would only invest limited capital for experimentation on the Web if there were no reliable measurement standard.[211] In 1998, a survey conducted by the Association of National Advertisers revealed that the lack of accurate measurement and difficulty in tracking ROI were considered the biggest barriers for advertisers reluctant to buy online ads.[212] From advertisers' point of view, Web advertising did not offer any palpable advantage over traditional commercial media based on the CPM model.

However, search engine firms had their own unique problems in attracting advertisers besides the lack of standard measurement. Search engines by their very nature are meant to move Web users away from the search site as quickly as possible. This was counter-intuitive for advertising purposes, because from the perspective of traditional media experience, users needed to stay on the site as long as possible to see and click on ads. In other words, search engine technology lacked the so-called "stickiness" needed for an ad-based business model to succeed. In fact, search engines were once even considered a failed business idea because they were only conduits to other pages. Shortly after major search engines went for IPOs in 1996*, Fortune Magazine* ran an article saying that Internet advertising was not working and search companies were losing money.[213] In

[210] Debra Williamson, "Early Internet days perilous," *AdAge*, March 28, 2005, http://adage.com/article/75-years-of-ideas/early-internet-days-perilous/102660/.
[211] Bermejo, *The Internet Audience*, 178**.**
[212] Kim Cleland, "Media buying & planning: marketers want solid data on value of internet ad buys: demand swells for information that compares media options," *AdAge*, August 3, 1998, http://adage.com/article/news/media-buying-planning-marketers-solid-data-internet-ad-buys-demand-swells-information-compares-media-options/64931/.
[213] Janice Maloney, "Yahoo: Still searching for profits on the Internet," *Fortune*, May 26, 2013, http://fortune.com/2013/05/26/yahoo-still-searching-for-profits-on-the-internet-fortune-1996/.

the article, Jeff Bezos, CEO of Amazon.com, expressed his doubts about online advertising and said that while Amazon advertised on all four search sites, he considered print ads in major publications like the *Wall Street Journal* to be more effective at delivering business to Amazon.

In response to this skepticism, search engines shifted to portals and offered various new services to attract more users and retain users in an effort to create "stickiness." Yahoo!, Excite, Infoseek, and other major engines provided a variety of other services like ISP, news, email, chat rooms, and Web hosting so users did not need to leave the site. As they pursued the building of portal sites, the search engines also began to build partnerships with Internet content providers, and ISPs. In 1996, Excite established a strategic alliance and co-branding services with AOL, which then had the biggest audience, and WebTV Networks to broaden its audience.[214] In 1997, Infoseek, Lycos, and Excite all joined forces with AT&T's online service which offered Internet access through AT&T's portal. The idea was that by connecting with AT&T, Internet search companies would try to generate additional advertising revenues and further expand into one-stop online services.[215] They tried to reposition themselves as ultimate digital destination sites by offering content and other services to incentivize users to stay on the search site longer – and see the ads.

By the late 1990s, Yahoo!, MSN, Lycos, Excite and other Web portals were growing rapidly as primary entries to the Internet. They rushed to acquire other companies to expand their range of services in the hopes of increasing the time a user

[214] Rebecca Heath, "The marketing 100: Excite: Scott Esptein," *Advertising Age,* June 30, 1997, http://adage.com/article/news/marketing-100-excite-scott-epstein/71587/.
[215] "AT&T to Sell Services on Yahoo's Web Sites," *Los Angeles Times*, May 19, 1998, http://articles.latimes.com/1998/may/19/business/fi-51198.

stayed on a portal.[216] Yahoo! offered online shopping, email services, free Web hosting services, online streaming and digital audio while it licensed its search engine technology from Inktomi. Many portal sites in fact licensed search technology, so search service became only a minor part of what search engines provided, and search itself was viewed as more of a traffic conduit to other Internet businesses.[217]

Yet, even the portal model did not last long. When the dotcom bubble burst in 2000-2001, the 280 Internet stocks lost $1.755 trillion from their 52 week high.[218] Within this 2-year period, $5 trillion in market value was wiped out which meant that people's pensions, retirement and mutual funds simply disappeared. Political economist and historian Robert Brenner describes this as "stock-market Keynesianism"[219] which was the result of deliberate state regulations to encourage a speculative bubble by permitting retirement, pension, and mutual funds to invest in risky assets as a form of venture capital and extremely low interest rate which helped dotcom start ups to easily raise capital to commercialize the Internet. In response to the dotcom recession, the Federal Reserve cut interest rates on several occasions, and this set up the next bubble (housing) as capital was looking for its next site of capital accumulation.[220]

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[216] Charles Warner, *Media selling: Television, print, Internet, radio* (Chichester, West Sussex, U.K: Wiley-Blackwell, 2009), 437.
[217] Jessica Livingston, *Founders at Work: Stories of Startups' Early Days* (Guildford: Springer London, 2007), 68.
[218] David Kleinbard, "The $1.7 trillion dot.com lesson," *CNN Money*, November 9, 2000, http://money.cnn.com/2000/11/09/technology/overview/.
[219] Robert Brenner, "New Boom or New Bubble?" *New Left Review* 24, January 2004, http://newleftreview.org/II/25/robert-brenner-new-boom-or-new-bubble.
[220] David McNally, *Global Slump: The Economics and Politics of Crisis and Resistance* (Oakland, CA: PM, 2011), 102.

During the 2000 peak in online advertising spending, dot-com firms were spending 77% of advertising on the Web;[221] but this dried up, and also brought about the collapse of the dominant form of ads – banner ads – which made it more difficult for search engine firms to generate revenues through advertising.[222] By mid-2000, most advertisers had moved away from banner ads and advertisers and pundits further questioned the brand building capabilities of online advertising. And advertising agencies set aside their digital subsidiaries and only valued online ads for direct response campaigns demanding a specific action from consumers.[223] This resulted in surplus ads space, which shifted the market to the advantage of advertisers.

Selling Search

After the Dot-com bubble burst, the *Wall Street Journal*, reporting on a study by Harris Interactive Inc and Jupiter Media Metrix Inc. noted that, "the very nature of the Web may be incompatible with effective advertising. Users simply have too much ability to ignore or click off what they don't want to see."[224] Advertisers and marketers pulled their marketing budgets from online ads, and this forced Web publishers to find new sources of revenue. Major search engines realized that banner ads were not enough to generate revenue to make them profitable.[225] Thus, they tried to reduce their dependence on online ads and altered their business model to fee-based services. In fact, Yahoo! was

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[221] Joseph Menn, "77% of Advertising on the Web is bought by dot-com," *Los Angeles Times*, September 6, 2000, http://articles.latimes.com/2000/sep/06/business/fi-16112; Eileen Colkin, "*Web* Ads Upend Industry Practices," *InformationWeek*, Jun 13, 2005, 54-56.
[222] Gabriela Taylor, *Advertising in a digital age: best practices & tips for paid search and social media advertising* (Global & Digital, 2012), 15.
[223] Damian Ryan and Calvin Jones, *Understanding digital marketing: marketing strategies for engaging the digital generation* (London: Kogan Page, 2009), 76.
[224] Peter Gumbel. "E-Commerce (A Special Report): Selling Strategies --- Advertising -- Ads Click: According to a Major New Survey, some Types of Online Advertising may Deliver the Goods, After all," *Wall Street Journal*, Oct 29, 2001, http://search.proquest.com/docview/398941244?accountid=14026.
[225] Owen Gibson, "Cash from clicking," *Guardian*, April 8, 2002, http://www.theguardian.com/media/2002/apr/08/mondaymediasection9.

adding new fee-based services in the late 1990s to see if users would be willing to pay for content or services.[226]

In the midst of this depressed ads market, there was some pulse as the search engine GoTo.com was attracting advertisers.[227] GoTo.com was charging advertisers to bid for placement in search results. This is called "sponsored search" or "paid search," where advertisers paid for preferred placement in search results. The concept of paid search is not new, rather it is similar to the *Yellow Pages* where advertisers paid to have their ads listed. However, in the early days, Internet communities vehemently resisted paid search, and many believed that search engines should display results based on the quality and relevance of Web content, not advertising dollars.[228] And there were several attempts by search engines to pursue paid listings as a business model, but they were not only actively rejected by users but also questioned by the search engine industry itself.

While Google is the best-known paid search engine, capital's attempts to sell search have a longer history. In 1996, the search engine OpenText first offered "preferred listing" services selling search results placement. The service allowed publishers to pay for higher search ranking results without requiring them to buy more expensive banner advertising.[229] Because the company was first in this area, it faced the brunt of scathing criticism from users, though it was welcomed by advertisers and marketers. Abe

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[226] Karen Angel, *Inside Yahoo!: Reinvention and the Road Ahead* (New York: John Wiley & Sons, 2002), 195.
[227] Saul Hansell, "Clicks for Sale; Paid Placement Is Catching On in Web Searches," *New York Times,* June 4, 2001, http://www.nytimes.com/2001/06/04/business/clicks-for-sale-paid-placement-is-catching-on-in-web-searches.html/.
[228] Brad Geddes, *Advanced Google AdWords* (Hoboken, N.J: Wiley, 2010), 69; David Kesmodel, *The domain game: How people get rich from Internet domain names*. (Philadelphia, PA: Xlibris Corp, 2008) 67.
[229] Karen Díaz, *Reference sources on the Internet: Off the shelf and onto the Web* (New York: Haworth Press, 1997), 6; "Engine sells results, draws fire," *CNET*, June 21, 1996, http://news.cnet.com/2100-1023-215491.html.

Kleinfield, a vice president at OpenText, said, "People thought it was immoral."[230] At the same time, Lilly Buchwitz, marketing manager for OpenText, addressed this issue, saying that the services were in response to marketers who demanded to be able to pay for preferred ranks on search results.[231] However, the company got so many complaints that the feature was abandoned in a matter of a few short weeks.[232] Yet, 2 years later in 1998, GoTo.com (which became Overture and was incorporated into Yahoo! Search Marketing in 2002) resurrected the OpenText business model of selling search results with its own unique features. And the company was putting itself up against ads serving firms like Engage, 24/7 Media, and MatchLogic, which ran banners and other forms of advertisements on Web sites.

This time, besides user resistance, search engine firms were even skeptical about GoTo.com's paid search since they saw users' response to OpenText and how OpenText failed to sell search. Brett Bullington, Executive Vice President of Strategic and Business Development at Excite expressed it thusly, "My feeling that the consumer wants something more [sic.] cleaner than commercialism."[233] Likewise, Lycos search manager Rajive Mathur said, "I'm not sure it's really providing value to the user, in the long term. I think they want some independent sorting."[234] Bob Davis, then CEO of Lycos, said, "With the Yellow Pages, listings are delivered alphabetically. There's no illusion there…. To me, this damages the integrity of the search service. This is like librarians putting

[230] Laurie Flynn, "With Goto.com's Search Engine, the Highest Bidder Shall Be Ranked First," *New York Times*, March 16,1996, http://www.nytimes.com/1998/03/16/business/with-gotocom-s-search-engine-the-highest-bidder-shall-be-ranked-first.html?pagewanted=2&src=pm.
[231] "Engine sells results, draws fire," *CNET,* June 21, 1996, http://news.cnet.com/2100-1023-215491.html.
[232] Bernard Jansen, *Understanding Sponsored Search: Core Elements of Keyword Advertising* (Cambridge: Cambridge University Press, 2011), 9.
[233] Danny Sullivan, "GoTo Sells Positions," *Search Engine Watch*, March 2, 1998, http://searchenginewatch.com/article/2066843/GoTo-Sells-Positions.
[234] Ibid.

books on the end [of a bookshelf] if you pay her some extra money. We would not do it with Lycos."[235] Despite much continued skepticism from the public and from search engine firms themselves, advertisers and marketers were drawn to GoTo.com because it had several features that appealed to them – and that were later adapted by Google – and set it apart from the other search engines.[236]

First, GoTo.com offered Cost Per Click (CPC) in which advertisers were charged only when a visitor actively clicked on their ad and landed on their site.[237] This performance-based pricing model enticed advertisers and marketers compared to the CPM model. As noted above, the CPC model had existed for a while, but it had not become popular among publishers. Second, keywords were sold in an automated auction where marketers bid for placement and the highest bidder was placed at the top of the search results. This guaranteed the targeted placement of advertisers' sites, as opposed to Yahoo!, which offered paid submission to its directory, but gave no guarantees that a company's ads would be included or have a particular placement order in its listing. Third, after the bid, human editors reviewed each link submitted by Webmasters to ensure the site and keywords were relevant, so the search engine displayed only relevant ads to users.[238] This increased the possibility of searchers clicking on advertisers' ads. This concept of relevance will be discussed later, but it became a core principle of Google's system. Fourth, it deployed a self-service advertising platform with no minimum spending, which removed the barrier between sales people and ads inventories

[235] Ibid.
[236] Geddes, *Advanced Google AdWords*, 2-3.
[237] David Kesmodel, *The domain game: How people get rich from Internet domain names* (Philadelphia, PA: Xlibris Corp, 2008), 69-70.
[238] Adam Eisner, "Small advertisers feel the pinch as GoTO.com defends price increase," *Search Engine Guide*, May 10, 2001, http://www.searchengineguide.com/andrew-goodman/small-advertisers-feel-the-pinch-as-goto-defends-price-increase.php.

and bypassed the paper contract.[239] With this potent combination of self-service, ads relevancy, and CPC pricing model, GoTo.com attracted both small businesses and large corporations. The search engine began its service with 15 advertisers, but by the end of 1999, the company had thousands of advertisers.[240]

However, the problem for GoTo.com was how to attract enough user traffic to monetize it. At the time when GoTo.com entered into the search market, there were plenty of other search engine options – such as Yahoo!, Lycos, AltaVista, Excite, Hotbot, and Microsoft MSN– so it was not easy to draw traffic since the company did not have a sufficiently popular brand.[241] Thus, GoTo.com had to turn to sites that already had heavy user traffic like Yahoo!, MSN, AOL, and Netscape. The company decided to syndicate its service, so that affiliated sites could embed the GoTo.com search box on their site, or use the GoTo.com search engine directly and identify the results as partner results. [242] In those cases, GoTo.com would share the revenue with partnering sites; by 2001, it had reached revenues of $667.7 million and turned into a profitable business.[243] The company offered non-ads sponsored search results as well as a complement to its ads-driven search. However, GoTo.com licensed its search technology from Inktomi for its non-sponsored listings.[244]

Yet, despite its early success, GoTo.com faced a dilemma because it had to rely on larger search engines or portals to serve the traffic it needed, and this put them in a

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[239] Geddes, *Advanced Google AdWords*, 3.
[240] John Battelle, *The search: How Google and its rivals rewrote the rules of business and transformed our culture* (New York: Portfolio; 2006), 112.
[241] Catherine Seda, *Search engine advertising: Buying your way to the top to increase sales*. Indianapolis, Indiana: New Riders, 2004), 7.
[242] Charles Hill and Gareth Jones, *Strategic management cases: an integrated approach* (Mason, OH: South-Western/Cengage Learning, 2007), 90.
[243] Ibid.
[244] "GoTo.com Adds Inktomi Search Functions," *ClickZ*, June 10, 1998, http://www.clickz.com/clickz/news/1716907/gotocom-adds-inktomi-search-functions.

vulnerable position since user traffic is the precondition for the search business.[245] GoTo.com founder Bill Gross even talked to Larry Page and Sergey Brin about a potential partnership; but Google rejected the idea and went their own way.[246] The company changed its name to Overture in 2001 and was eventually acquired by Yahoo! in 2003. Up until GoTo.com, search engine firms couldn't figure out a way to monetize user traffic; but Bill Gross built an advertising system that offered the basis for transforming search traffic into profit-making.

GoTo.com and Google entered into the search business at a similar time. Unlike GoTo.com, Google had plenty of traffic when it considered running ads, but it had no backend advertising system. In addition, Google was advantageously insulated from the dot-com meltdown in online advertising and had not been exposed to the collapse of banner ads because it hadn't moved to the ads-based business model until after the bubble burst. When Google was looking for revenue sources, the ads-based business model was not its first choice. In fact, Sergey Brin and Larry Page were opposed to ad-supported search services because Brin believed, "advertising-funded search engines would be inherently biased toward the advertisers and away from the needs of consumers."[247] Thus, initially Google tried to license its PageRank search technology to other search engines rather than trying to compete in the already extremely competitive search market. By early 2000, Google was mainly generating the majority of its revenue through licensing fees. Since a search engine was an expensive and capital-intensive business, most portals

[245] Kevin Lee, *The truth about pay-per-click search advertising* (Upper Saddle River, N.J: FT Press, 2009), 27; Jansen, *Understanding sponsored search*, 13.
[246] Hill and Jones, *Strategic management cases: An integrated approach*, 110.
[247] Sergey Brin and Larry Page, "The Anatomy of a Large-Scale Hypertextual Web Search Engine," *Computer Networks and ISDN Systems* 30, no. 1-7 (1998), http://infolab.stanford.edu/~backrub/google.html.

like Netscape, AOL, and even Yahoo! later outsourced search to Google. Google still had to compete with incumbants like AltaVista and Inktomi, both of whom concentrated on the development of search technologies rather than moving to a portal model.[248] In particular, AltaVista was one of the most used search engines before Google gained popularity. However, AltaVista – at that time known for having high-end processors – was using a centralized index to answer queries from users, which made it difficult to deal with the large and growing amount of Web content, while Google chose to adopt a distributed crawling architecture in which the task of url crawling and indexing was distributed among multiple machines, making it markedly faster and more scalable.[249] Despite the fact that Google was drawing user traffic and building a national brand as a search engine, it was a challenge for Google to position itself as a service provider to large enterprises. Elizabeth Van Couvering pointed out that there were not enough enterprises to which to sell search services.[250] Also, as Ken Auletta points out, unlike AOL, Yahoo! and the other portal sites, Google couldn't count on subscription revenue and content sites on which to display banner ads,[251] bringing it reluctantly back to advertising.

When Google was trying to figure out ways to run ads on its site, banner ads were still the dominant format. However, Google was hesitant to run banner ads. Sergey Brin said, "We are about money and profit … Banners are not working and click-throughs are

[248] Douglas Edwards, *I'm feeling lucky: The confessions of Google employee number 59* (Boston: Houghton Mifflin Harcourt, 2011), 60.
[249] Shivanshu Rastogi, Zubair Iqbal and Prabal Bhatnagar, "Search Engine Techniques: a Review," *MIT International Journal of Computer Science & Information Technology* 2, no. 2 (2013), 56-57, http://www.mitpublications.org/yellow_images/1381121411_logo_Search%20Engine%20Techniques-A%20Review.pdf.
[250] Van Couvering, "Search Engine Bias," 99.
[251] Auletta, *Googled*, 63.

failing. I think highly focused ads are the answer."[252] Google's alternative to banner ads were small and targeted text ads, though they were not even sure if targeted text ads would be attractive to advertisers and be successful because text ads had never been used for brand building. Google had a back up which was DoubleClick. Brin and Page said, "if we start to see that we're running out of money, well then we'll just turn on a deal with DoubleClick and we will be fine because we have a lot of traffic."[253] Given that DoubleClick was the leading banner ads operator at the time, Google was planning to outsource its ads business to DoubleClick in case its own ads business failed.[254]

It's noteworthy that before Google's search ads dominated the Internet, DoubleClick, which is now owned by Google, was the largest online ads network, and dominated the banner ads market. It pioneered large-scale online advertising by offering targeted ads using its patented Dynamic Advertising Reporting and Targeting (DART) ad management system to schedule, track and bill for ad placement among its network of content providers. By the end of 1998**,** DoubleClick's network had grown to more than 1,300 Web sites. However, its revenue was highly concentrated, with 61.2% derived from four Web publishers – including 44.7% of DoubleClick's revenue from AltaVista alone.[255] AltaVista, which did not have in-house advertising sales, outsourced its ads service to DoubleClick. Google was considering going the same route as AltaVista, but then the bubble burst in Spring 2000, and the online ad banner market crashed, so this induced Google to build its own ad program. [256]

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[252] David Vise and Mark Malseed, *The Google story* (New York, N.Y: Delacorte Press, 2005), 87.
[253] Battelle, *The Search*, 124.
[254] Scott Karp, *Google AdWords: A brief history of online advertising innovation,* May 27, 2008, http://publishing2.com/2008/05/27/google-adwords-a-brief-history-of-online-advertising-innovation/.
[255] Scott Reeves, To DoubleClick Or Not To DoubleClick? *Barron's,* February 16,1998, http://online.barrons.com/news/articles/SB887413994242883500?tesla=y.
[256] Ibid.

In October 2000, Google officially launched its advertising system called *AdWords* with 350 customers on a flat CPM pricing model. AdWords was very different from today's ads system, but it was self-serve and was restricted to relevant text ads. Google limited ads titles to 25 characters and one link, and displayed no more than eight small ads on the results page of any search. The ads results looked like part of the search results. Google had a few tactical reasons to go with small and targeted texts ads. This was not only to offer an alternative to banner ads, but also to try and ease some immediate technical and social obstacles.

Besides their ineffectiveness, banner ads often took too long to load and slowed down the system. In early 2000, the majority of users were still connected via dial up Internet connections with 56k modems, so banner ads required more time to display. By mandating its own 25 character text ads as the standard, Google was able to speed up the ad serving process, which allowed for users to conduct more searches and the company to serve more ads in a given time. With its text ads, Google was able to improve efficiency and speed, which became the major factors in Google's profit-making search business. Further, targeted small text ads gave an illusion to users that the ads were part of the results, and blurred the line between search and ads results, treating them in a similar way. "If you treat advertisements as a great search result, they will work as a great search result" said Omid Kordestain, Vice president of business development and sales at Google.[257] This deflected some users' resistance to paid search.

Yet, Google's AdWords didn't immediately take off. The CPM based ads model still did not appeal to advertisers, and the system in general was still underdeveloped. According to Jeff Levick who worked on Google's ads team at that time, "we were cold-

[257] Mindy Charski, "Google's Ad Program stresses simplicity," *Inter@ctive Week* 7, no. 33 (2000): 14.

calling people, trying to get them to buy keywords."[258] Less then 2 years after launching its first iteration of AdWords, the company overhauled the system and its search business began to take off.

Making the Secret Sauce

Google's later versions of AdWords were closer to its current system. Soon after launching the second iteration of its system, Google changed its pricing model from CPM to CPC. CPC was a more attractive model to advertisers because it imposed less risk to advertisers since they did not need to pay for impressions that were not clicked on.[259] Yet, the core features of Google's later ads system were its ads algorithm, which determines Google's ads rank, and its keywords auction system used to calculate ads price. Google designed an ads system that hit the trifecta – it maximized its profit and concomitantly drew in both users and advertisers, all the while persistently projecting a public image of "all about users."

Google distinguished itself from its rival GoTo.com's generalized first price auction (GFP) system where first position was given to the highest paid bidder. Rather than price, Google incorporated a user feedback loop into the system to place more "relevant" ads by adding Click Through Rate (CTR) to determine ads ranking for each query in real time. Google called their system AdRank (an ad's maximum bid times its CTR = AdRank), which determines the order of ads in response to a user's query. Despite being a controversial Web metric standard, CTR was one of the accepted measurements

[258] Will Oremus, "Google's Big Break," *Slate*, October 13, 2013, http://www.slate.com/articles/business/when_big_businesses_were_small/2013/10/google_s_big_break_how_bill_gross_goto_com_inspired_the_adwords_business.html.
[259] James Shanahan and Goutham Kurra, "Digital Advertising: an Information Scientist's Perspectives," in *Advanced Topics in Information Retrieval*, ed. Massimo Melucci et al., (Berlin: Springer, 2011), 212; Bernard Girard, *The Google way: How one company is revolutionizing management as we know it* (San Francisco: No Starch Press, 2009), 31.

among both advertisers and publishers, who associated CTR with user interest and intent. Google's incorporation of CTR into its ads algorithm was merely the beginning of their systematic attempts to have user feedback generate more relevant/targeted ads. This principle of relevance seems an obvious factor for a traditional information retrieval system; however, for a money-making advertising system, it seemed paradoxical on its face – one would think that if Google relied on the highest bidder, it would receive more in return; yet Google's seeming unselfishness toward users in relying on relevance proved to be the core driver of its profit-making, and the building of an ads system in which the House always wins.

Google quickly extended its ads relevance algorithm/ads ranking system to include more than just CTR. It introduced its so-called *Quality Score* (QS). In addition to CTR, QS today includes the relevance of each keyword to its ad group, landing page quality and relevance, the relevance of ad text, and historical AdWords account performance, among other undisclosed ingredients of relevancy factors. Google continually tweaks its ads algorithm QS over time as it updates its search algorithm. Google then factors this QS into its keywords auction program. If a keyword's QS is too low, then it is automatically disqualified from participating in the auction. AdWords recalculates QS with only qualified keywords and multiplies the second QS and keyword's CPC bid to calculate an ad's rank. In its auction system, unlike GoTo.com's "generalized first price auction," Google has employed a generalized second price (GSP) auction to reduce the volatile pricing and inefficiency in investment to try to game the system that tend to happen in generalized first price auctions.[260] Second price auctions work such that the price that the

[260] Benjamin Edelman, Michael Ostrovsky and Michael Schwarz, "Internet Advertising and the Generalized Second-Price Auction: Selling Billions of Dollars Worth of Keywords," *American Economic*

advertiser pays is not the advertiser's maximum bid price – this helps to assuage advertisers' feelings of overbidding or overpaying for ads services. Unlike the generalized first price auction (GFP) in which the winning bid is the highest bid, the GSP is the minimum amount above the second place bid that an advertiser will pay in order to win the auction. GSP is a more attractive model to advertisers and prevents volatility of auction price.[261] Higher quality scores lower the overall cost of ads – meaning Google gets less money per ad – but this spurs advertisers to create and maintain "quality" ads that meet Google's requirements – and cause more ad clicks for advertisers and therefore more ad revenue for Google over time. Eric Schmidt affirmed this, saying, "Improving ad quality improves Google's revenue … If we target the right ad to the right person at the right time and they click it, we win."[262]

Google emphasizes the idea that its ads algorithm is scientific, objective and purely data driven, and vows that this complex proprietary ads system is for users and user experience. However, Google isn't purely concerned with users' or advertisers' experience per se, rather Google has a calculated capital logic to maximize its profit.[263] Google organized its ads system to generate more profit by putting its version of "relevant" ads higher on the list, where they have more chance to be seen and clicked on by more users.[264] In this way, Google prevents itself from having advertisers on the top that may be generating little traffic and revenue. Google's emphasis on relevance led it to

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Review 97, no. 1 (2005): 246; Bernard Jansen. *Understanding Sponsored Search: Core Elements of Keyword Advertising* (Cambridge: Cambridge University Press, 2011), 188.
[261] Ibid.
[262] Saul Hansell, "Google Wants to Dominate Madison Avenue, Too. New York Times," October 20, 2005, http://www.nytimes.com/2005/10/30/business/yourmoney/30google.html?pagewanted=al.
[263] Charles Arthur, *Digital wars: Apple, Google, Microsoft and the battle for the Internet* (London: Kogan Page, 2012), 42.
[264] David Vise and Mark Malseed, *The Google Story* (London: Macmillan, 2005), 90.

pass the other search engines by.[265] The most relevant ad has the most profitable auction price point. In Google's ads system, the best matched advertising is not merely limited to the most relevant from the traditional sense of an information retrieval system, but it also implies best revenue generation of pricing point from an economic perspective.[266] Omid Kordestani, Google's 12th employee, described Google's ad system in an interview:

> We applied auction theory to maximize value – it was the best way to reach the right pricing, both for advertisers and for Google. And then we innovated by introducing the rate at which users actually click on the ads as a factor in placement on the page, and that was very, very useful in relevance.[267]

Google also launched its AdSense program to place ads beyond its search site and other Web properties and embed ads on individual Web sites willing to be part of Google's content network in exchange for sharing advertising revenues. Google did not build AdSense technology but acquired it from Applied Semantics and absorbed their AdSense content-targeted ads technology including the AdSense name. Self-serve AdSense enticed online publishers by giving access to Google's massive network of advertisers from AdWords to any Web publishers who signed up with its program. With a few lines of JavaScript code inserted into the Web page itself, AdSense would search for and embed relevant ads from its ads network using Google's search algorithm. The AdSense program is a way to inject capital into the entire Web on a large scale since the

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[265] Will Oremus, "How Google's Jeff Dean became the Chuck Norris of the Internet," *Slate,* January 23, 2013, http://www.slate.com/articles/technology/doers/2013/01/jeff_dean_facts_how_a_google_programmer_became_the_chuck_norris_of_the_internet.single.html.

[266] Shuai Yuan, Ahmad Zainal Abidin, Marc Sloan and Jun Wang, "Internet Advertising: An Interplay among Advertisers, Online Publishers, Ad Exchanges and Web Users," (working paper, Department of Computer Science, University College London, 2012): 3, http://arxiv.org/abs/1206.1754.

[267] "Interview with Google's chief business officer Omid Kordestain," *John Battelle's search blog*, October 26, 2005, http://battellemedia.com/archives/2005/10/titans_column_omid_kordestani.php.

company doesn't need to rely on its own staff to insert ads into each Website or create Web content in which to place ads.[268]

As Google was rapidly taking off, Yahoo! began to strengthen its own search services by acquiring Inktomi, as well as AltaVista and AlltheWeb through its acquisition of Overture (nee GoTo.com) in 2003.[269] Soon after, Yahoo! stopped licensing Google's search technology and began to use its own in-house search engine. In 2006, Microsoft also joined the sponsored search auction business.[270] By 2007, Yahoo! had added its own quality-based bidding to its sponsored auction ad system to combat Google. Despite all this, Yahoo! was never able to raise its own proprietary technology on par with Google's ad system.

Jason Spero, the head of global mobile sales and strategy at Google, calls AdWords the "nuclear power plant at the core" of the company.[271] *New York Times* columnist Randall Stross wrote, "the best minds at Yahoo!, Microsoft and Google's smaller rivals have spent years trying to replicate Google's ad placing formula and all have failed to do so."[272] Often, Google's success is attributed to its superior search engine algorithm PageRank over other search engines; but in fact, a large part of its profit-making relies on the 24/7 marketplace of its ads system that is designed to monetize user search activities. What then is the role of its search engine?

This 24/7 marketplace cannot run without a search engine. Underneath Google's ads system, Google has its "free" search engine that attracts users and generates massive

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[268] Arthur, *Digital wars*, 39.
[269] Charles Warner, *Media selling: Television, print, Internet, radio* (Chichester, West Sussex, U.K: Wiley-Blackwell, 2009), 439.
[270] Jansen, *Understanding sponsored search*, 179.
[271] Kunur Patel, "Google Takes Mobile Ads to 1 Million More Advertisers," *Advertising Age*, June 7, 2012, http://adage.com/article/digital/google-takes-mobile-ads-1-million-advertisers/235211/.
[272] Randall Stross, *Planet Google: One company's audacious plan to organize everything we know* (New York: Free Press, 2008), 6.

amounts of user traffic, the precondition of search business. The search engine exposes users to ads as they conduct everyday searches, and then feeds user search data back into Google's ad system to display ads based on users' past or potential interests. The extracted, computed, and contextualized user data from users' everyday search activities are fueling Google's ads system to target "the right ad to the right person at the right time."[273] Google hoards its immense data reservoirs that are constantly being filled and refilled by searchers' everyday information activities across Google's search and other Web properties. One of Google's former employees described Google.com as "a living laboratory processing data that reveals what is effective and what is not."[274] Using data from users' search activities, Google is working on perfecting its advertising system. Eric Schmidt, in a 2007 interview with *Wired Magazine*, was asked, "how should we think about Google today?" Schmidt responded:

> Think of it first as an advertising system**.** Then as an end-user system – Google Apps. A third way to think of Google is as a giant supercomputer. And a fourth way is to think of it as a social phenomenon involving the company, the people, the brand, the mission, the values -- all that kind of stuff.[275]

Tellingly, in his response, Schmidt did not mention search, what many people think of as Google's essential function. Did he forget about Google's search technology or misrepresent Google? Hardly. It's a rare moment, but the description of Google in this interview is in fact an accurate one – Google's business is built primarily on advertising systems with side ventures attempting to radically diversify their data streams and revenue sources.

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[273] Saul Hansell, "Google Wants to Dominate Madison Avenue, Too," *New York Times,* October 30, 2005, http://www.nytimes.com/2005/10/30/business/yourmoney/30google.html?pagewanted=all.
[274] Edwards, *I'm feeling lucky, 59*, 281.
[275] Fred Volestein, "As Google Challenges Viacom and Microsoft, Its CEO Feels Lucky," *Weird,* April 9, 2007, http://archive.wired.com/techbiz/people/news/2007/04/mag_schmidt_qa?currentPage=all.

There is additionally a lesser-known piece of Google's advertising system that feeds data back to the mother ship and supports the company's profit-making project. It is Google analytics, which generates detailed statistics on Web traffic, traffic sources, what pages visitors are viewing and how long for marketers. While Google AdWords collects data on users' search activities on Google's site, Google analytics follows users as they travel through the entire Web.

In 2005, Google acquired San Diego Web analytics' firm Urchin Software Corp, rebranded its service as Google Analytics and began to offer free Web analytic services to Google AdWords customers. Google was the first company to offer Web analytic services for free. At that time, other firms were charging fees, and Yahoo! and Microsoft did not have a sufficient analytic tool for their advertisers who were clamoring for more data.

By giving away its "free" analytics tool, Google was first able to appeal to advertisers who were hesitant to adopt online advertising. Even if Google was giving its analytics for "free," if it were able to attract more advertisers by providing a feedback loop to measure their advertising, the company calculated that it could be more profitable.[276] Second, Web analytics were still evolving, and over 80% of advertisers on the Web were not using analytics at that time.[277] If Google analytics could be adopted widely, then it could be the de facto Web analytics standard. By offering quantifiably measurable ROI, Google provides a tool to justify search spending. Third is data. Google analytics users have to insert Google-provided JavaScript into every Web page they

[276] Brett Crosby, "The Path to Acquisition," *Stanford University Technology Venture Program*, February 13, 2008, http://ecorner.stanford.edu/authorMaterialInfo.html?mid=1905.
[277] "Analyzing Google's Analytics Strategy," *Business Week*, November 14, 2005, http://www.businessweek.com/stories/2005-11-14/analyzing-googles-analytics-strategy.

serve, and all their site statistics end up on Google's servers.[278] This is a way for Google to acquire massive amounts of 2-way Web traffic data in exchange for its "free" analytics tool. All of these data are fed into its advertising system.

The role of user data in Google's profit-making will be discussed further in the next chapter; however, given the importance of user data in its search business, it should not come as a surprise then that Google has a voracious appetite for data as the company devours what it gleans from users' searches, keystrokes and movements, to their homes and email, and its wide-ranging political efforts to control user data across the globe.

For Google and other Internet firms, mining, managing and controlling user data are not options, but business imperatives. Bruce Schneier, a security expert, observed, "Surveillance is the business model of the internet."[279] Grounded in this surveillance based business model, search engines have been scaled up to large enterprises by automating and mechanizing ads selling, buying and serving processes.

Large Scale Enterprise

Steven Levy (2009) describes Google's AdWords as "the world's biggest, fastest auction, a never ending, automated, self-service version of Tokyo's boisterous Tsukiji fish market."[280] The tuna auction in Tsukiji fish market is run by skilled auctioneers, from 5am to 7am, but Google has built an automated system that runs 24/7 with an auction-based online marketplace on a massive scale.

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[278] Justin Cuttroni, *Google Analytics* (Sebastopol, Calif.: O'Reilly, 2010).
[279] Dan Gillmore, "As we sweat government surveillance, companies like Google collect our data," *Guardian,* April 18, 2014, http://www.theguardian.com/commentisfree/2014/apr/18/corporations-google-should-not-sell-customer-data.
[280] Steven Levy, "Secret of Googlenomics: Data-Fueled Recipe Brews Profitability," *Wired,* May 22, 2009.

Traditional advertising production was labor- and time-intensive as it required staff to customize ads design, campaigns, schedules, and placement that might require meetings, phone calls, and production schedules. Even in the early Web era, the process of buying, selling and serving ads depended on manual recording, ad scheduling, and tracking on number of visits or impressions, assisted by staff, and ads were also bought and sold through individual contracts which were negotiated on a case-by-case basis; advertising sales were oriented toward the larger advertisers.[281]

This rapidly changed in the mid-1990s Dot-com era when a range of new advertising technologies were developed including online ads networks, data profiling technologies, Web metrics, ad serving and management technologies. Ads buying, selling and serving processes were further automated and mechanized. By the mid to late 1990s, a host of ads serving technology firms like Focal Link, MatchLogic, Flycast, DoubleClick, NetGravity, AdForce, SoftBank, and CMGI had emerged and developed technical capabilities for ads sales, targeting, serving and tracking under one integrated system. For instance, in 1996, Yahoo! used NetGravity's AdServer to schedule, place, target, track, measure and manage banner ads and further automate and speed up ads management. In particular, DoubleClick – acquired by Google in 2007 – first deployed its ads network model in its online and centralized ads serving system, which built a foundation for large-scale online advertising.[282] Mentioned earlier, DoubleClick as the largest ad broker was considered the Google of its time, and major advertisers and publishers used them. In 1997, DoubleClick's network of server computers delivered

[281] De Liu, Jianqing Chen and Andrew Whinton, Current issues in Keyword Auction in *Business Computing*, edited by Gediminas Adomavicius et al. (Bingley, UK: Emerald, 2009), 73.
[282] Crain, "The revolution will be commercialized," 36.

over 500 million ads impressions a month, and by 1999, it was delivering 500 million *a day*.[283] The company's services delivered ads from 3,600 different advertisers.[284]

However, DoubleClick was still limited to large advertisers and publishers representing sites with at least 1 million page views monthly[285] and required a formal sales contract with those sites.[286] The company was known for having one of the largest and most aggressive sale forces on the Internet, and roughly 500 of its 1,400 employees were working in its sales unit.[287] However, the coming years would see the search engine industry figure out ways to exponentially scale up their ads businesses.

GoTo.com and Google launched self-service platforms instead of having a sales representative to pitch ads directly to individual advertisers or publishers. While they were selling premium ads in person, they automated the majority of the management of ad buying, selling and serving process. By instituting an automated self-serve model with no minimum spending, Google and other search engine firms were able to quickly expand their ads business on a mass scale without hiring thousands of sales people. Using the Internet as a business platform, the self-serve model shifted labor costs to advertisers, marketers and publishers by giving them the tools to work on buying, targeting and tracking ads. At the same time, the search engine firms further automated their ad-serving systems from ads allocation to payment scale by using algorithms. The result is that, in 2012, Google alone had more than one billion advertisers, and generated 29.8 billion ad

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[283] Michael Indergaard, *Silicon Alley: The Rise and Fall of a New Media District* (New York: Routledge, 2004), 52.
[284] Sloane Lucas, "DoubleClick Divides: 6 New Unites Emerge," *Brandweek* 40, no. 41(1999): 60.
[285] Steve Vonder Haar, "DoubleClick Opens Ad Network for Small Sites," *Inter@ctive Week* 7, no. 4 (2000): 22.
[286] Tim O'Reilly, "What is Web 2.0: Design Patterns and Business Models for the Next Generation of Software," *Communication Strategies* 1, no.1 (2001), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1008839.
[287] Loren Fox, "DoubleClick Climbs to the top of the ad world," *Upside,* February, 2000: 58-60.

impressions every single day between ads on its own site and ads on its network.[288] Eric Schmidt describes Google as an operating system for advertising, and now Google continues to hone its ads OS to speed up and serve as many ads as possible.[289]

This is a major reason why Google has been spending massive amounts of capital on building the infrastructure described earlier, to accelerate its ads serving by speeding up search – more and faster search means more ads. From the beginning, Google tried to squeeze out better performance from its hardware, wrote a myriad of customized software to speed its data processing and built its massive industrial sized infrastructure. Urs Hölzle, Google's search guru and SVP of Infrastructure, points out that speed has been Google's mantra from its early days and "speed is the essence when it comes to search results."[290] He asserted, "when you speed up service, people become more engaged – and when people become more engaged, they click and buy more … Speed isn't just a feature, it's *the* feature."[291]

Today search engines are fighting for every millisecond.[292] Google calls this its "Gospel of Speed" – a rule that it requires all Google engineers and product managers to follow: "Don't launch features that slow us down."[293] In 2010, Google introduced a new search-before-you-type feature called *Google Instant* to shave 2 to 5 seconds from the average 25 second search speed. Google's own data showed that four tenths of a second

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[288] John Koetsier, "30 billion times a day, Google runs an ad (13 million times, it works)," *Venture Beat*, October 25, 2013, http://venturebeat.com/2012/10/25/30-billion-times-a-day-google-runs-an-ad-13-million-times-it-works/.
[289] John Battele, "The Advertising System," *John Battele's Search Blog*, April 9, 2007, http://battellemedia.com/archives/2007/04/the_advertising_operating_system.php.
[290] Urs Hölzle, "The Google Gospel of Speed," *think with Google,* January 2011, http://www.thinkwithgoogle.com/articles/the-google-gospel-of-speed-urs-hoelzle.html.
[291] Ibid.
[292] Steve Lohr, "For Impatient Web Users, an Eye Blink Is Just Too Long to Wait," *New York Times,* February 29, 2012, http://www.nytimes.com/2012/03/01/technology/impatient-web-users-flee-slow-loading-sites.html?pagewanted=all/.
[293] Hölzle, "The Google Gospel of Speed."

would translate to 8 million less searches per day, and millions fewer ads.[294] Marissa Mayer, then vice president of search products and user experience said, "It's search at the speed of thought."[295] "Two hundred fifty milliseconds, either slower or faster, is close to the magic number now for competitive advantage on the Web," said Harry Shum, a computer scientist and speed specialist at Microsoft.[296]

So far, Google has succeeded in designing a ubiquitous, lightning-fast, and powerful system that has allowed the company to monetize users' information activity on a massive scale and generate obscene amounts of wealth. Yet, the online advertising environment is changing at a rapid rate due to the increasing use of a range of Internet connected devices such as smartphones, tablets, smart TVs and others. Google is under pressure to respond to this changing environment, and understands that it is not enough to maintain control over the ads business by merely relying on its current ads system. Thus, Google is now busy reassembling its back-end ads technologies with new acquisitions as well as in house developments to assure its profit-making in other forms as ads proliferate across other hardware devices.

Reassembling the Machine

In 2005, Google vowed that "there will be no banner ads on the Google homepage or Web search results pages." However, by 2013, the company had begun to experiment with banner ads for 30 brands, which appeared at the top of brand search results in the US only. Google stopped its experimentation after 6 months, but Google's bold move hints at

[294] Kit Eaton, "How One Second Could Cost Amazon $1.6 Billion In Sales," *Fast Company*, March 15, 2012, http://www.fastcompany.com/1825005/how-one-second-could-cost-amazon-16-billion-sales.
[295] Amir Efrati, "Google's New Features Designed to Speed Web Searches," *Wall Street Journal*, September 8, 2010, http://online.wsj.com/news/articles/SB10001424052748703453804575479821579919484.
[296] Lohr, "For Impatient Web Users, an Eye Blink Is Just Too Long to Wait."

the company's ambition to conquer display ads, which are generally used for brand building. Marketers expect that display ads will outpace search ads by 2016 with $74.4 billion driven increasingly by mobile and video ads.[297] Yet, it is worth noting that despite online display ads being the fastest growing advertising media, display ads market's profit margin is still low because there is an oversupply of display ads and they are known for low click through rates. In the U.S. alone, 1.1 trillion display ads are shown online each quarter, but the advertising industry has not yet fully solved the so-called "banner blindness" which means that consumers simply ignore banner ads after a short period of time. Despite their limitations, display ads have become more important for the advertising industry, as users shift to mobile where they spend more than 80% of their time inside mobile apps,[298] and the increase of the online video market, which aims to garner some of the lucrative spending on television ads. Google is retooling its backend advertising technology to aim at not-fully-tapped markets, and to reduce its reliance on search ads.

Google's acquisition of DoubleClick in 2007 was largely to purchase its tool for selling and serving display ads. Google has been rebuilding this display ads platform and gradually integrating it into its larger ads infrastructure. Google linked AdWords to DoubleClick and relaunched it as *DoubleClick Ad Exchange (AdX)* to directly compete with other big ad exchanges run by Yahoo!'s right media and Microsoft.[299] The Ad Exchange platform facilitates the bid buying and selling of display, video and mobile ads

[297] Ginny Marvin, "Display To Eclipse Paid Search Ad Spend In 2016, Mobile Set To Become 4th-Largest Ad Medium," *Marketing Land*, April 7, 2014, http://marketingland.com/display-eclipse-paid-search-ad-spend-2016-mobile-set-become-4th-largest-ad-medium-79309.
[298] Simon Khalaf, "Flurry Five-Year Report: It's an App World. The Web Just Lives in It," *Flurry*, April 3, 2013, http://www.flurry.com/bid/95723/Flurry-Five-Year-Report-It-s-an-App-World-The-Web-Just-Lives-in-It#.VSq1XbqyIns.
[299] Michale Learmonth, "Google revamps DoubleClick, puts own names on it," *Advertising Age*, February 22, 2010, http://adage.com/article/digital/digital-marketing-google-revamps-doubleclick-ad-server/142237/.

from multiple ad networks, individual Websites, and large publishers.[300] The emergence of the Ad Exchange business is the result of the advertising industry's efforts to rationalize and further mechanize the online ads market. There are massive marketplaces consisting of many ad networks, individual Websites, and large publishers and serving targeted ads is made more complex when a variety of different devices are added to the mix. The advertising industry is trying to figure out ways to buy and sell ads process in order to increase ads prices and ads accuracy for display ads. Ad Exchanges have arisen to make it easier and more efficient to find the audiences and impressions by programmatically matching ads buyers and sellers at the right time and at the right price.[301]

Google's AdX includes AdSense publishers and AdWords advertisers and generates a massive demand on both the buying and selling sides.[302] Initially, Google's AdX was only available to premium publishers, but now it has been expanded to include small and medium publishers as well. Through its DoubleClick Ad Exchange, Google has also built Real Time Bidding (RTB) – search-like real time bidding systems for cross-platform display advertising.

There are four components in the RTB environment – advertisers/advertisement agencies, a Demand Side Platform (DSP), Ad Exchange, and a Publishers/Supply Platform. Ads Exchanges like DoubleClick consist of two sides; on the one hand is the Demand Side Platform (DSP) and on the other is the Supply Side Platform (SSP). The

[300] Jack Marshall, "WTF is an ad exchange?" *Digiday*, January 39, 2014, http://digiday.com/platforms/what-is-an-ad-exchange/.
[301] Rich Karpinski, "Ad Networks and Exchanges 101," *Advertising Age*, April 19, 2010, http://adage.com/article/special-report-ad-network-exchange-guide-2010/ad-networks-exchanges-101/143310/.
[302] Zachary Rodgers, "Google's Ad Exchange Opens for Business," *ClickZ*, September 9, 2010, http://www.clickz.com/clickz/news/1710314/googles-ad-exchange-opens-business.

DSP works as the agency of advertisers by bidding and tracking on selected ad networks; while the SSP works as the agency for publishers by selling impressions and selecting optimal bids.[303] Over the years, Google has built its own DSP and SSP platforms in concert with a number of acquisitions. The company acquired DSP Invite Media, recoded it, re-launched DoubleClick Bid Manager as a demand side platform,[304] bought the supply side platform AdMeld in 2011 and integrated it into its DoubleClick Ad Exchange.[305] DoubleClick Ad Exchange interface connects the supply and demand sides and facilitates the purchase of inventory via RTB.

In RTB, each impression is bid for in real time, as opposed to a static auction where the impressions are typically sold in bundles of 1000. RTB allows buyers to bid on an impression-by-impression basis using data about user behavior, intent, semantics, geography, device, location and demographics. This extremely complex method is hyper-data-driven and promises to deliver the right ad to the right consumer at the right time on the right device. The model that Google is pursuing is similar to AdWords that is targeting individuals, but it generates display advertising on large advertising networks.

The RTB market promises accuracy and speed as its selling points. Google describes that in its RTB, the bidder has to respond to an exchange request within 100 milliseconds and this speed of response has an impact "everywhere along the bidder's

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[303] Kevin Reynolds, "Are Ad Exchanges and Real Time Bidding The Next Big Thing?" *Advertising Perspectives,* http://www.advertisingperspectives.com/adblog/media-technology/are-ad-exchanges-and-real-time-bidding-the-next-big-thing/.
[304] "Getting Real With DoubleClick Bid Manager," *DoubleClick Advertiser Blog*, October 24, 2012, http://doubleclickadvertisers.blogspot.com/2012/10/getting-real-with-doubleclick-bid.html.
[305] David Kaplan, "Google Continues AdMeld, Wildfire Integrations, Aiming Higher For Brand Dollars," *adexchanger,* March 21, 2013, http://www.adexchanger.com/online-advertising/google-continues-admeld-wildfire-integrations-aiming-higher-for-brand-dollars/.

technology stack, from the physical infrastructure to the implementation of bid logic."[306] Given technologies that support AdExchanges are complex and capital intensive, it's not surprising that Google and Microsoft, with their deep pockets and extensive infrastructures, are leading the way in building out Ad Exchanges to include RTB ads systems.[307]

Yet, Facebook and Twitter are right behind them, joining the RTB market for mobile display ads and beefing up their backend ads technology infrastructures. Yahoo! also acquired Flurry, the mobile ad exchange, to bolster its mobile market. Flurry has its own RTB platform called the Flurry marketplace that facilitates the process of selling ads across different web properties.[308] Even Amazon threw its hat into the RTB market by building its own proprietary platform that can plug into ad exchanges or supply platforms.

RTB marketing is growing. International Data Corporation (IDC) predicts RTB spending worldwide will reach $20.8 billion by 2017, accounting for 28% of all online display advertising sales,[309] while it is still a relatively small segment of ads market and faces uncertainties – given that the technologies have not been proven yet. However Google is preemptively trying to occupy the market and is attempting to get a firm grip on its backend ads technologies as they evolve as it did similarly with search ads.

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[306] "Real-Time Bidder Solution for Google Cloud Platform," *Google Cloud Platform*, https://cloud.google.com/developers/articles/real-time-bidder-solution-for-google-cloud-platform.
[307] Kevin Reynold, "Are Ad Exchanges and Real Time Bidding The Next Big Thing?" *Advertising Perspectives,* http://www.advertisingperspectives.com/adblog/media-activation/are-ad-exchanges-and-real-time-bidding-the-next-big-thing/.
[308] "Yahoo Eyes Mobile Ad Dollars With Flurry Acquisition," *Forbes,* July 24, 2014, http://www.forbes.com/sites/greatspeculations/2014/07/24/yahoo-eyes-mobile-ad-dollars-with-flurry-acquisition/.
[309] IDG, "Real Time Bidding in the US and the World 2011-2016," October 2012, http://www.pubmatic.com/reports/7_IDC-Research_Q32012.pdf.

Today, the most crucial function of search on the Internet served by the marketplace seems naturalized and accepted with no alternatives. However, given its history, this was not an imperative, rather there has been a long march for capital to monetize search coupled with US government's efforts to spur the commercialization of the Internet. Alternatively, publicly funded search technology could have been bolstered within the public information provision space like libraries and organized as a public utility. Instead, search has turned into the foundation of a giant advertising system, has been fully integrated into the very core of capital accumulation processes by monetizing people's everyday activities, and has become a large-scale information enterprise.

The question to then explore in the next chapter is: who is laboring behind this newly emerged large-scale information industry? A highly automated search engine industry seems to require little human labor; however, it has distinctive labor processes, which offer us a glimpse of the emerging labor structure and labor control in the Internet sector. The following two chapters are devoted to the labor behind the search engine to shed light on characteristics and organization of labor processes in the search engine industry.

Chapter 3

Laboring behind the Search Engine

According to one IT industry expert, the search engine is 21st century infrastructure – and "building and maintaining a search engine is so expensive and labor intensive that it requires the same kind of planning and upkeep that, say, the Golden Gate Bridge does."[310] This statement defies the popular notion of the search engine industry as the emblem of the "new" information economy, which, unlike the industrial capitalist economy, needs very little in the way of human labor. Yet, technology as a social process embodies human labor, and the search engine is no exception – every link on the Web and each keystroke on a computer, tablet, or smartphone contain human labor. Search engine technology is so seamlessly embedded in our daily lives, however, that it masks a whole series of complex labor processes that enable and animate it; these processes, moreover, provide an unmatched window onto our contemporary social organization.

This chapter uncovers the labor structure of the search engine industry to clarify both the changing social relations between capital and labor, and the search industry's own profitable expansion. What are the distinctive modes and forms of labor organization that assist in the search engine industry's profitable accumulation? Who is actually laboring to deliver information instantaneously in response to our seemingly highly automated search queries and where are these workers located? By answering these questions, this chapter illustrates representative patterns of labor in a leading Internet industry. But before discussing specifics, the chapter begins by setting labor within a larger context of changes gripping the information and communications workforce.

[310] Keren Dagan, "Google's search engine is the 21st infrastructure," *Webnomea*, June 11, 2010, http://Webnomena.com/2010/06/11/googles-search-engine-is-the-21st-infrastructure/.

Surplus Labor

5 years after the great recession, which wiped out 8.4 million jobs between 2008 and 2009, President Obama celebrated US economic progress and declared, "We have got back off our feet [sic], we have dusted ourselves off… Construction is up. Manufacturing is back. Our energy, our technology, our auto industries, they're all booming."[311] He reminded the public that the unemployment rate was at its lowest point since September of 2008, and the economy was improving. In fact, in 2014, the Department of Labor reported the unemployment rate at 6.2%, down from its recession peak of almost 10% official unemployment rate.[312] Indeed, it seems that the US economy has improved; however, President Obama's "booming" economy does not translate to the majority of everyday Americans.

The official unemployment rate is 6.2%; however, this does not give the full picture of the current labor condition. The official unemployment rate does not account for missing workers who are neither employed nor actively looking for jobs because they are discouraged by job prospects and have given up searching for a job. In October of 2014, the Economic Policy Institute (EPI) estimated that if these missing workers were included in the government's calculations, real unemployment would be at 9.6%.[313] Moreover, there is a massive number of workers who are chronically underemployed – a situation when workers want to work full-time, but are forced to work part-time (involuntary part-time) due to economic conditions or work at jobs for which they are

[311] The White House Office of the Press Secretary, "Remarks by the President on the Economy -- Kansas, City, MO," July 30, 2014, http://www.whitehouse.gov/the-press-office/2014/07/30/remarks-president-economy-kansas-city-mo.
[312] Peter Morici, "Real unemployment rate is at least 18 percent," *Hill*, July 31, 2014, http://thehill.com/blogs/congress-blog/economy-budget/213834-real-unemployment-rate-is-at-least-18-percent.
[313] Elise Gould, "The Unemployment Rate Fails to Take into Account Missing Workers," *Economic Policy Institute*, October 3, 2014, http://www.epi.org/blog/unemployment-rate-fails-account-missing/.

overqualified. For college students over the last decade, the average underemployment rate has been 44%, and for black college students, the average has been 50%. What's worse, during the "recovery" from the 2008 recession, the majority of employment gains have been concentrated in lower waged occupations, and with millions of Americans still looking for work and underemployed, capital has no urge to raise wages for those who are working.[314]

In this "booming" economy, these vast pools of labor power are evidently not needed by the search industry or, indeed, by the information sector at large. But they do play an important ideological function for the Internet industry to serve their interests. In response to the high unemployment rate, Google Chairman Eric Schmidt stated at the 2012 World Economic Forum in Davos, Switzerland, "…there are plenty of companies in the US and other countries I've visited that are very short of highly skilled workers." Schmidt answered that the problem of unemployment is the result of inadequate skills among the workforce, which therefore may be solved with better education. Echoing the industry's complaints that it suffers from a shortage of "highly skilled" workers, President Obama launched an engineering initiative to train 10,000 engineers per year in "collaboration" with the private sector and proposed to reform the education system to put more emphasis on Science, Technology, Engineering and Math (STEM).

While the Internet industry is crying over the shortage of skilled labor and asking for government assistance, IBM, Cisco, Hewlett-Packard, AT&T, and Microsoft are laying off large numbers of workers as they face emerging Internet services and a rapidly

[314] Annie Lowery, "Recovery Has Created Far More Low-Wage Jobs Than Better-Paid Ones," *New York Times,* April 17, 2014, http://www.nytimes.com/2014/04/28/business/economy/recovery-has-created-far-more-low-wage-jobs-than-better-paid-ones.html?_r=0; "The Low-Wage Recovery and Growing Inequality," *National Employment Law Project*, August, 2012, http://www.nelp.org/page/-/Job_Creation/LowWageRecovery2012.pdf?nocdn=1.

changing IT market. In July 2012, Cisco slashed 1,300 workers – 2 percent of its global workforce[315] – and recently announced that it would cut an additional 6000 workers as part of the company's restructuring plan. In September 2012, HP announced that the company would lay off 29,000 workers by 2014 as it eliminated roughly 8 percent of its workforce – to become a "leaner and more profitable" company.[316] Over the last decade, HP has eliminated 120,000 jobs, almost equivalent to the populations of Mountain View and Palo Alto combined.[317] Google itself, which had not used layoffs beyond eliminating 200 sales personnel and 100 contractors in 2009,[318] went on to cut 20 percent of the workforce of its newly acquired Motorola Mobility,[319] and sold off the company within a year. In 2013, BlackBerry reduced its workforce by 40% – 45,000 workers.[320] In July 2014, Microsoft announced that the company was planning to cut 14% of its workforce – as many as 18,000 employees, 12,000 of whom were from Nokia, its mobile business acquired in 2014. This is considered the "biggest round of layoffs" in Microsoft's history.[321] In response, Chinese workers at Microsoft's Nokia factory at Yizhuang Industrial Park took to the streets to protest against Microsoft's mass layoff. In his public memo to Microsoft employees, CEO Satya Nadella said that this drastic change was

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[315] Ken Presti, "Cisco Confirms Layoffs; Cuts 2 Percent Of Workforce," *CRN*, July 23, 2012, http://www.crn.com/news/networking/240004198/cisco-confirms-layoffs-cuts-2-percent-of-workforce.htm.
[316] Todd Wasserman, "HP Job Cuts to Reach 29,000 in Reorganization," *Mashable,* September 10, 2012, http://mashable.com/2012/09/10/hp-29000-jobs/.
[317] Larry Walsh, "Few Worries as HP layoff tally Climbs up to 29,000," *Channelnomics*, September 11, 2012, http://channelnomics.com/2012/09/11/worries-hp-layoff-tally-climbs-29000/.
[318] Nicholas Carlson, Google's Layoffs, Explained. *Business Insider,* March 31, 2009, http://articles.businessinsider.com/2009-03-31/tech/29962746_1_google-s-europe-sales-force-search-ads.
[319] Sayantani Ghosh and Alexei Oreskovic, "Google to cut 4,000 Motorola Mobility jobs, shares rise," *Reuters,* August 13, 2012, http://www.reuters.com/article/2012/08/13/us-motorolamobility-jobs-idUSBRE87C07F20120813.
[320] Roger Cheng, Layoffs may be over as BlackBerry looks to grow again, *CNET*, August 5, 2014, http://www.cnet.com/news/blackberry-layoffs-may-be-done-as-company-looks-to-grow-again/.
[321] Alison Griswold, "Microsoft Layoffs Would Be the Fourth-Biggest in Tech's Modern History," *Slate*, July 18, 2014, http://www.slate.com/blogs/moneybox/2014/07/18/microsoft_cuts_18_000_jobs_it_s_the_fourth_biggest_tech_layoff_ever.html.

necessary to become "more agile and move faster."[322] Microsoft's reorganization of its labor force was done in order to shift its business toward cloud and mobile. Industry experts predicted that in 2014, layoffs in IT sectors would reach their highest levels since 2009 at the peak of the recession.[323] A *Forbes* article wrote at the time that, "layoff is a permanent feature in the tech sector."[324]

These massive layoffs seem contradictory given it is the most dynamic business sector, but it is indicative of an IT sector which is demonstrably undergoing a wide-ranging reorganization with the rise of new Internet businesses, but also highly uneven workforce restructuring, and exhibiting disparate and even contradictory trends that are deeply marked across the length and breadth of the information workforce. The labor incarnated in the search engine industry needs to be situated and understood within this vortex. I now turn to examine some trends characteristic of the high-pay, high-status segment of the occupational structure – in the information industry in general and the search industry in particular.

Top of the Pyramid

As the Internet sector expands, it generates new kinds of occupations, labor demands and workplace structures. And one of the characteristics of the labor structure within emerging Internet industries like search and social media is a concentration at the top of disproportionately well-paid and highly skilled workers. The workers categorized as "highly skilled" labor referenced by the flourishing search engine industry are

[322] "Starting to evolve our organization and culture," *Microsoft News Center*, July 17, 2014, http://news.microsoft.com/2014/07/17/starting-to-evolve-our-organization-and-culture/.
[323] Cadie Thompson, "Tech job cuts to soar in 2014," *CNBC*, July 28, 2014, http://www.cnbc.com/id/101872278.
[324] Kay Roger, "Layoffs in Tech Now a Permanent Feature," *Forbe*s, February 6, 2014, http://www.forbes.com/sites/rogerkay/2014/02/06/layoffs-in-tech-now-a-permanent-feature/.

computer scientists, software engineers (applications), Web developers and computer systems engineers/architects, as the industry expands its territory to include mobile, wireless technologies, cloud, app development, VoIP, and medical data. According to a 2011 report released by the *Northern Valley Job Training Consortium (NOVA)*, the most highly sought-after jobs in Silicon Valley where Google, Facebook, Yahoo!, Apple, eBay all reside, are computer engineers and project managers who often have engineering degrees. More specifically, the most-demanded "high skilled" IT occupations considered by Silicon Valley IT industry are software engineers, field applications engineers, quality assurance engineers and user interface designers.[325]

These "highly skilled" IT workers are often said to be akin to those of well-paid young "Googlers" who have four-year- or advanced degrees in computer engineering and business and the nature of their work has to do with computer systems design, scientific research and development and/or management and business. Many of them come from elite universities. Google recruits many of its employees from Stanford University, University of California Berkeley, MIT, Carnegie Mellon, and UCLA,[326] the historic hubs of the Academic-Military-Industrial Complex (AMIC). This is not a surprise given that the origins of the search engine industry are tightly rooted in AMIC, where engineers

[325],"Silicon Valley In Transition," *Silicon Valley Workforce Investment Board,* July 2011, 15, http://bwresearch.com/reports/BW_NovaTechReport_072011.pdf; Abby Lombardi, "Tech Talent Demands in the Silicon Valley," *Wanted Analytics*, April 28, 2014, https://www.wantedanalytics.com/analysis/posts/tech-talent-demands-in-the-silicon-valley.

[326] Henry Blodget, "And Here's The Secret Reason Apple Is Crushing Google," *Business Insider*, March 25, 2012, http://www.businessinsider.com/and-heres-the-secret-reason-apple-is-crushing-google-2012-3; Mary Ann Milbourn, "Who is hiring Google?" *Orange County Register*, March 31, 2012, http://economy.blog.ocregister.com/2012/03/31/who-is-google-hiring/106711/; David Orenstein, "Google grew from Stanford engineering, and the relationship continues to provide answers to tough problems," *Phys.org*, April 29, 2011, http://phys.org/news/2011-04-google-grew-stanford-relationship-tough.html; Ken Auletta, "Get Rich U. There are no walls between Stanford and Silicon Valley. Should there be?" *New Yorker*, April 30, 2012, http://www.newyorker.com/reporting/2012/04/30/120430fa_fact_auletta; Max Nissen, "What Facebook, Twitter, Google, and Apple employees have in common," *Quartz,* March 7, 2014, http://qz.com/183958/what-facebook-twitter-google-and-apple-employees-have-in-common/.

have historically had access to both technical training and capital. Engineers with venture capitalists, guided by capital expansion, have been undertaking the transformation of search technologies into one of the most powerful sectors of the information industry.

Google describes its company as an engineering company and states that its, "engineers make an impact on billions of users."[327] Ken Auletta states that Google is run by engineers: "Google's leaders are not cold businessmen; they are cold engineers."[328] These engineers, under the guidance of corporate goals, design and build search technologies to be productive and profitable. While search companies typically do not reveal the number of engineers that they have, LinkedIn lists 18,882 engineers at Google as of June 2014. To give some perspective, the number of full, associate and assistant faculty members of the 50 top US Computer Science Programs is 2,200 – Google has almost 10 times more engineers than all of these academic programs put together.[329] LinkedIn estimates that at Google, 55% of its employees have a Bachelor's degree, 36% possess a master's degree and 7% a PhD degree.[330] In fact, this engineer-driven search industry has been absorbing "highly skilled" IT workers for quite a while. During the worst economic downturn since the Great Depression – when other established IT companies like IBM, Cisco and HP were shedding workers in a rapidly restructuring IT market – Google added more than 4,500 workers in 2010 and announced that the

[327] Matt McGee, "Yes, Bing Has Human Search Quality Raters & Here's How They Judge Web Pages," *Search Engine Land*, August 15, 2012, http://searchengineland.com/bing-search-quality-rating-guidelines-130592; "Human Search Quality Raters on Bing & What They Look For," *Top Marketing Strategies*, August 15, 2012, http://topmarketingstrategies.com/human-search-quality-raters-on-bing-what-they-look-for

[328] Auletta, *Googled,* xii.

[329] This dataset was collected as a project for a Human Computer Interaction course at Brown University in Spring of 2014. Detailed data is available at http://cs.brown.edu/people/alexpap/faculty_dataset.html; Nissen, "What Facebook, Twitter, Google, and Apple employees have in common."

[330] "Google employs way more R&D employees than most other tech companies," *Business Insider,* http://www.businessinsider.com/10-charts-that-explain-the-state-of-googles-employees-today-2012-3#google-employs-way-more-rd-employees-than-most-other-tech-companies-1.

company would aggressively recruit more than 6,200 workers in 2011, primarily in engineering and sales.[331] In 2011, Google's workforce grew by 33 percent, or more than 8,000 employees, and as of January of 2014, Google had 4000 open positions.[332] Struggling Yahoo! even added workers in 2011, but soon after the company had begun to make cuts as it had lost market share.[333]

This demand for "highly skilled" IT labor by new Internet companies has been pushing up wages for this class of young IT workers, with an average age of less than 35 years old – the average age of workers at Google is 29; Facebook 28 and Apple 33.[334] Google pays newly graduated computer science majors $90,000 to $105,000.[335] Google software engineers earn an average base salary of $128,336 and their counterparts at Microsoft and Yahoo! earn over $100,0000. By comparison, the average starting salary of a U.S. teacher is $39,000; the average ending salary – after 25 years in the profession – is $67,000.[336] And half of all Americans earned less than $27,529 according to the 2014 Social Security report.[337]

It is telling that new Internet companies indeed create well-paid jobs, but the story not told to the public is that they tend to nourish and enrich only a small cadre of very high-skilled workers by generating a relatively narrow array of jobs that require

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[331] "Help wanted: Google hiring in 2011," *Google Official Blog,* January 25, 2011, http://googleblog.blogspot.com/2011/01/help-wanted-google-hiring-in-2011.html.
[332] "Best Companies 2014," *Fortune*, http://fortune.com/best-companies/google-1/.
[333] Mike Swift, "Google dominates Web Sector," *San Jose Mercury News*, April 21, 2012, http://www.mercurynews.com/business/ci_20417591/sv150-silicon-valley-150-google-dominates-Web-sector.
[334] Quentin Hardy, "Technology Workers Are Young (Really Young)," *New York Times,* July 5, 2013, http://bits.blogs.nytimes.com/2013/07/05/technology-workers-are-young-really-young/.
[335] Clair Miller and Jenna Wortham, "Silicon Valley Hiring Perks: Meals, iPads and a Cubicle for Spot," *New York Times,* March 21, 2011, http://www.nytimes.com/2011/03/26/technology/26recruit.html?_r=0.
[336] David Eggers and Clement Calegar, "The High Cost of Low Teacher Salaries," *New York Times*, April 30, 2011, http://www.nytimes.com/2011/05/01/opinion/01eggers.html.
[337] "Wage Statistics for 2012," *Social Security Online*, October 12, 2014, http://www.ssa.gov/cgi-bin/netcomp.cgi?year=2012.

considerable education and skills. Given the entirety of STEM occupations in which many of the highly skilled workers in the Internet sector are categorized, this is less than 5 percent of all jobs in the US economy, and the computer-related workforce within STEM occupations is less than 2.5 percent.[338] This reflects a structural shift occurring in the IT sectors, which can be seen in changing workforce patterns in Silicon Valley where many of these new Internet companies reside.

Over the years, the majority of the existing high-tech firms in the field of computer systems design, telecommunication, semiconductor equipment manufacturing, and data processing shed jobs as they automated, standardized or outsourced their work to lower-cost regions in the US and abroad. Now even higher-skilled tech jobs like engineers and computer programmers are being sent to places like India and China, where there is an increasingly abundant supply of lower-cost IT workers. A decade ago, one-quarter of the jobs in Santa Clara County – the heart of Silicon Valley – were at high tech manufacturing firms. But nearly one-third of those jobs have relocated, as the valley's focus has shifted toward software and the Internet.[339] Silicon Valley has been the symbol of new economic growth, but over the past decade between 2002-2012, it has not added any net new jobs; instead, the employment rate has fallen 2% according to a 2012 report by the community labor organization Working Partnerships in USA.[340] In particular, middle-wage jobs fell to 46 percent of the work force, from 52 percent. All start-up success stories and the wealth in the Valley – the region that the world wants to

[338] Hal Salzman, Daniel Kuehn, and Lindsay Lowell, "Guest workers in the high-skill U.S. labor market: An analysis of supply, employment, and wage trends," *Economic Policy Institute*, April 24, 2013, http://www.epi.org/publication/bp359-guestworkers-high-skill-labor-market-analysis/.
[339] Scott Thurm and Pui-Wing Tam, "California's Boom Masks State's Uneven Recovery," *Wall Street Journal*, August 15, 2012, http://online.wsj.com/article/SB10001424052702303505504577405221289491972.html.
[340] "Life in the Valley Economy: Saving the Middle Class: Lessons from Silicon Valley," *Working Partnerships USA*, 2012, http://www.wpusa.org/Publication/LIVE2012.htm.

emulate – have not translated into the creation of jobs or been generalized to the rest of the population. During the recession, the unemployment rate rose as high as 11%. Silicon Valley is today boasting about its 5.4% unemployment rate; however, what's left unstated is that the Valley's recent job growth is mainly from jobs that pay less than $50,000 annually – an annual income far below what is necessary to afford the median price of a home in the area.[341]

Over the past decade, the industry mix in the Valley has shifted away from middle-wage manufacturing towards the very high-wage information- and services sectors. The new information economy is polarizing the workforce and deepening wage inequality in Silicon Valley as well as the US as a whole. From 2000 to 2010, the number of households in Santa Clara County, the hub of Silicon Valley, who earned less than $10,000 a year more than doubled – increasing by 128%.[342] Almost a third of the Valley's workers earn less than $16 an hour, not a sustainable wage given the area's high cost of living, and another third of wage earners make less than $36/hour.[343] The poverty rate in Silicon Valley has surged, and tent cities have sprung up around the Valley, which has the largest homeless encampment in the US, called "the jungle."[344] The bottom is expanding, defying the common notion that the Valley's productivity, driven by the new information economy, will distribute wealth and reduce poverty. It is true that the "new" economy redistributes wealth, but as David Harvey points out, wealth is redistributed to the top.

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[341] Esther Lee and Aviva Shen, "Class Divide Widens Between Low-Wage And High-Wage Workers In Silicon Valley," *Think Progress*, October 16, 2013, http://thinkprogress.org/immigration/2013/10/16/2779601/wage-immigrants-silicon-valley/.
[342] Working Partnerships USA, *Life in the Valley Economy*, 39.
[343] Working Partnerships USA, *Life in the Valley Economy*, 18.
[344] Robert Johnson, "Welcome to 'The Jungle:' The Largest Homeless Camp In Mainland USA Is Right In The Heart Of Silicon Valley," *Business Insider*, September 7, 2013, http://www.businessinsider.com/the-jungle-largest-homeless-camp-in-us-2013-8?op=1#ixzz3GS6TuvbL.

Unlike the popular rhetoric, new Internet companies generate a relatively small number of "highly skilled" workers whose capabilities can be adapted to meet current market changes. Compared to traditional IT companies, Google, Yahoo!, Facebook or Twitter do not require many workers to design their algorithms or service-based products.[345] For instance, Google is larger than software and hardware company Oracle in terms of revenue, but Google's highest number of workers was 54,604 in 2013 after doubling its workforce with its 2012 Motorola Mobility acquisition, while Oracle had 122,458 workers in 2013. Social news site Reddit has only 11 employees servicing a site that can handle hundreds of thousands of unique visitors per hour; the photo sharing social network company Instagram, before being acquired by Facebook, had only a team of 16 to support 30 million users and a $1 billion valuation.[346] The Search engine industry and other internet-based businesses have often been perceived as creating a large number of highly skilled jobs, but compared to traditional IT industry, it tends to generate a relatively narrow array of jobs that require considerable education and skills. Contrary to popular notions, the search engine industry in fact operates with only a small cadre of very high-skilled workers at the top.

However, this small number of highly skilled workers is not even insulated from capital's effort to cut labor costs and increase profits. The industry is rallying together to further open the skilled labor market. Companies in Silicon Valley, contrary to recent anti-immigration rhetoric against working class immigrants in the US, have long been the most outspoken protestors against US caps on visas for "highly skilled" foreign workers.

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[345] Marcus Wohlsen, "Silicon Valley Creating Jobs, but not for everyone," *Wired,* August 3, 2012, http://www.wired.com/business/2012/08/silicon-valley-creates-jobs-but-not-for-everyone/.
[346] Water Chen, "4 Secrets to Silicon Valley's Productivity," *Business Inside*, June 1, 2012, http://www.businessinsider.com/4-secrets-to-silicon-valleys-productivity-2012-6.

While they have been silent on the US government's deportation of 2 million working class immigrants, Google, Microsoft, Apple, Facebook and other major IT companies have been at the forefront of lobbying the US Congress to reform immigration laws to increase the number of H-1B visa holders to bring more "highly skilled" workers from other countries, if not completely remove the barriers to bring in an indefinite number of foreign IT workers. Laszlo Bock, Senior Vice President of People Operations at Google writes, "… at a time when the U.S. economy needs it most, our immigration policies are stifling innovation … Our experiences here at Google and in the tech sector show us that immigrants to the US are a powerful force for entrepreneurship and innovation at every level, from start-ups to multinational corporations."[347]

Since the 1990s, the US Department of Labor has issued between 65,000 and 200,000 H-1B visas per year to allow foreign-born workers with specialized skills to work in the United States on a temporary basis.[348] More than half of these H-1B visas have been issued to technology related positions. The top H-1B visas holders were not Google or Facebook, but they were multinational information technology consulting and outsourcing firms – Cognizant Technology, Wipro Limited, and Cisco Systems topping the list. In 2013, IBM received 1624 H-1B visas, Microsoft had 1048, and Google had 753.[349] Google, Facebook, and other Silicon Valley firms desperately want more access to the global pool of skilled – cheaper – labor.

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[347] Suzy Khimm, "Do we need more skilled foreign workers?" *Washington Post*, March 21, 2013, http://www.washingtonpost.com/blogs/wonkblog/wp/2013/03/21/do-we-need-more-skilled-foreign-workers/.

[348] "H-1B Fiscal Year (FY) 2015 Cap Season," *US Citizenship and Immigration Service,* http://www.uscis.gov/working-united-states/temporary-workers/h-1b-specialty-occupations-and-fashion-models/h-1b-fiscal-year-fy-2015-cap-season.

[349] Deepak Chitnis, "50% of H-1B visas in 2013 went to offshore companies, mostly in India," *American Bazaar*, April 2, 2014,

As mentioned earlier, Eric Schmidt, at Davos in 2012, attributed the problem of unemployment during the 2008 recession to a shortage of "highly skilled" labor; and before that Microsoft founder Bill Gates testified before the US House Committee on Science and Technology, stating that US companies were facing a severe shortage of scientists and engineers with the skills needed to cultivate future innovative information technologies. Gates asked that Congress reform immigration policies to allow indefinite numbers of "highly skilled" foreign workers to work for US companies. In 2007, Google VP of People Operations Laszlo Bock testified before the US House Judiciary Subcommittee on Immigration, urging Congress, "to significantly increase the annual cap of 65,000 H-1B visas, to a figure more reflective of the growth rate of our technology-driven economy."[350] In 2012, Brad Smith, Microsoft's general counsel and executive vice president, said that tech companies faced a workforce crisis because of the severe shortage of qualified applicants.[351] He pointed out that Microsoft had 3,400 open positions for researchers, developers and engineers – an increase of 34 percent from 2011 – and that the skills gap was one of the major impediments for the company.[352]

Claiming "shortages" of skilled labor, in 2013, Facebook CEO Mark Zuckerberg, supported by Microsoft's Bill Gates and Google's Eric Schmidt, formed a political lobbying group FWS.us to focus specifically on immigration reform and rallying around immigration reform bills to serve its business interests. The IT sector also banded together to back several immigration bills such as Science, Technology, Engineering and

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http://www.americanbazaaronline.com/2014/04/02/50-h-1b-visas-2013-went-offshore-companies-mostly-india/.

[350] Pablo Chavez, "What U.S. immigration policies mean to Google," *Google Blog*, June 06, 2007, http://googleblog.blogspot.com/2007/06/what-us-immigration-policies-mean-to.html.

[351] Brendan Sasso, "Microsoft: shortage of tech workers in the US becoming 'genuine crisis,'" *Hill*, September 27, 2012, http://thehill.com/blogs/hillicon-valley/technology/258985-microsoft-lack-of-tech-workers-approaching-genuine-crisis.

[352] Ibid.

Mathematics (STEM) Jobs Act, Startup Act 2.0, STEM visa legislation and Brains Act.[353] Put succinctly, the industry is demanding that the US government intervene to enlarge its "highly skilled" labor force, because the barrier to transnational mobility of IT workers can only be resolved by nation state regulation.

The IT industry's urgent demand to the state for more "highly skilled" foreign workers to cope with the "shortage" of labor has not persuaded the majority of IT workers and many experts on the IT labor force. The definition of "highly skilled" in industry is not static; rather it varies depending on changing economic base and technologies.[354] Thus, the skill shortages refer to the gap between the estimated demand for workers with a particular skill and the number of available workers at the very moment without considering unemployed IT workers who could learn the requisite skills.[355]

Technology union *Washington Alliance of Technology Workers* has voiced the perspective that tech CEOs' persistent claims of a shortage of highly skilled tech engineers is far from true and that there are thousands of domestic tech workers that are either underemployed or out of work. In fact, there has been no evidence of a shortage of "highly skilled" labor; the US actually produces three times more STEM degrees than the economy can use[356] and less than 30% of STEM degree holders are working in their

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[353] Eric Larson, "'BRAINS' Act: More Green Cards for STEM Workers," *Yahoo News*, September 19, 2012, http://news.yahoo.com/brains-act-more-green-cards-stem-workers-125827247.html.

[354] Biao Xiang, *Global "body Shopping": An Indian Labor System In the Information Technology Industry* (Princeton, NJ: Princeton University Press, 2007), 26.

[355] Ibid.

[356] Beryl Lieff Benderly, "What Scientist Shortage?" *Columbia Journalism Review*, January 12, 2012, http://www.cjr.org/reports/what_scientist_shortage.php; National Science Board, "2008 Science and Engineering Indicators", http://www.nsf.gov/statistics/seind08/.

chosen fields.[357] The 2014 *Science and Engineering Indicators* Report showed that between 2007 and 2010, the unemployment rate for engineers more than doubled – from 2.4 percent to 4.6 percent – even though it remains below the national average.[358] In 2011, when Google announced it would hire 6,000 employees, the company received more than 75,000 job applications.[359] Google receives over 1 million resumes each year and only hires between 1,000 to 4,000 people annually.[360] Paul Krugman, the economist and *New York Times* columnist, wrote that multiple studies have found no support for the linkage between inadequate workers' skill and high unemployment. He railed that the myth of the US suffering from a "skilled gap" " … should have been killed by the evidence, but refuses to die."[361]

Yet, indeed, there is a demand for new kinds of skill sets that can be immediately applied to churn out new products for new businesses; however, the IT industry's claim of a shortage of workers has been their way to enlarge the labor supply, allowing them to have a more flexible labor pool at lower cost, while maintaining expansionary momentum.[362] Harvard economist George Borjas explains that raising the supply of doctorates by just 10 percent through immigration lowers pay in a given field by 3 to 4 percent.[363] The industry's rhetoric of catastrophic labor shortages is an attempt to increase the mobility of highly skilled labor and justify the reform of immigration laws in

[357] "Science and Engineering Indicators 2014," *National Science Board*, http://www.nsf.gov/statistics/seind14/index.cfm/chapter-3/c3s3.htm#s1.
[358] Ibid.
[359] Danny Goodwin, "75,000 People Really Want to Work at Google," *Search Engine Watch*, February 3, 2011, http://searchenginewatch.com/article/2050072/75000-People-Really-Want-to-Work-at-Google.
[360] Claire Gordon, "Google Is Hiring: The Secret To Getting A Job At Google," *AOL Jobs,* August 24, 2012, http://jobs.aol.com/articles/2012/08/24/want-to-get-a-job-at-google-heres-how/.
[361] Paul Krugman, "Jobs and Skills and Zombies," *New York Times*, March 30, 2013, http://www.nytimes.com/2014/03/31/opinion/krugman-jobs-and-skills-and-zombies.html?_r=0.
[362] Xiang, *Global Body Shopping,* 17.
[363] George Borjas, "Immigration in high-Skill labor Markets: The Impact of Foreign Students on the earnings of Doctorates," *National Bureau of Economic Research*, 2006, http://www.nber.org/papers/w12085.

order to have access to foreign labor as they expand to global markets and to hire more temporary, lower-paid foreign workers. Despite the fact that foreign workers are required to be paid comparably to American workers, in 2006, the US Government Accountability Office (GAO) found that 54% of foreign workers holding H-1B work visas were paid less than their American counterparts.[364]

As the competition between and among global IT companies has intensified, the industry has made a concerted effort to liberalize and reorganize not only low waged workers but also increasingly "highly skilled" workers to create a large and more casualized labor pool for its rapidly changing sector. As Xiang points out, since the high tech industry was financialized in the 1990s, the value of the IT industry is tightly linked to fluctuations within the stock market and the industry's hiring and layoff cycles, as noted at the beginning of this chapter, a common practice to beef up companies' valuations.[365] Zynga, the social game company, is a recent example. The company laid off 5% of its workforce soon after its stock price plummeted. Microsoft's announcement of a 14% cut of its workforce in 2014 lifted its stock price 3.7%. The logic of capital here is not only to have an abundant skilled labor pool, but also a highly mobile workforce that can be quickly deployed to constantly changing market conditions.[366] This signifies that the labor market is extremely volatile, and there is no job security even if one is "highly" skilled in the current "new" information based economy.

Russell Hancock, president of Joint Venture Silicon Valley, summing up the current labor conditions in Silicon Valley – the heart of the "new" economy – said, "You

[364] H-1 Visa Program Reforms are needed to Minimize the Risks and Costs of Current Program, *United States Government Accountability Office (GAO)*, 2011, http://www.gao.gov/new.items/d1126.pdf.
[365] Xiang, *Global Body Shopping,* 6.
[366] Ibid.

can have companies doing well and you can have all this startup activity, but it no longer means lots of jobs."[367] Then does this mean that the search engine industry merely depends on a small number of highly skilled workers? The answer is no. I turn now to show some characteristic features of the information industry at the other end of the pay scale as I demonstrate that the search engine industry is able to depend on only a small number of skilled workers, not just because it is a highly automated industry, but because the industry has appropriated a large number of invisible low and unwaged workers to prop them up.

Low-Waged Workers

The myth of the search engine industry is that it is exclusively, even generally, reliant on highly-paid workers. As we have seen, the industry does rely on a dense array of highly skilled, young and educated employees. However, it is likewise crucially dependent on a large and growing number of low-waged contingent workers who serve the Internet industry and are rendered mostly invisible by this same myth. Beneath the small segment of senior software engineers, research scientists, product managers, sales engineers, financial analysts, and the like, are legions of low-waged workers. Huws describes them as process workers who work under strict direction and tight control and are isolated from their co-workers.[368] This group's much-needed work is obfuscated by seemingly magical technology, but there is actually a distinctive hierarchy and division of labor within this sector of the labor force.

For years, Google has attributed the supremacy of its search results to its automatically configured algorithm. While Yahoo! began its search business based on its

[367] Marcus Wohlsen, "Silicon Valley Creating Jobs, but not for everyone," *Wired*, August 3, 2012, http://www.wired.com/business/2012/08/silicon-valley-creates-jobs-but-not-for-everyone/.
[368] Huws, *The Making of a Cybertariat.*

– paid – human indexed directory, Google and others developed automated crawl-based search technology. There are no longer human indexers per se as search engine technology has become automated, but their work has not been entirely eliminated; rather this automation has led to the emergence of a new class of low-waged workers who are practically invisible.

Google rarely talks about its outsourced, low-waged workers, but it has admitted to hiring a great number of human evaluators to pretest its algorithms. They are often referred to as "quality raters," or "search engine evaluators" whose task is to determine the relevance of search engine results before the company releases an alteration to its algorithm. The head of Web spam at Google, Matt Cutt, acknowledged the role of quality raters in responding to the Search Engine Optimization (SEO) community, which expressed concern that raters were affecting search results. Cutt defended the objectivity of Google's search results and said, "Human raters work under the Search Quality Evaluation Team and are used in the initial testing phases of proposed changes to the organic search algorithm."[369]

Google started to advertise for quality rater positions in late 2004 and hired them directly, but today they are no longer recruited by Google. Rather, Google hires them through contractors like Appen Butler Hill, iSoftStone, Lionbridge, Leapforce and ZeroChaos (formerly WorkforceLogic), IT outsourcing companies specializing in supplying global IT workers to large multinational corporations.[370]

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[369] Miranda Miller, "How Google Uses Human Raters in Organic Search," *Search Engine Watch*, March 2, 2012, http://searchenginewatch.com/article/2172154/How-Google-Uses-Human-Raters-in-Organic-Search.

[370] Matt McGee, "An Interview With A Google Search Quality Rater," *Search Engine Land,* January 20, 2012, http://searchengineland.com/interview-google-search-quality-rater-108702;

Under terms such as Multimedia Judge, Internet Search Administrator, Speller Web Content Assessor, Query Understanding Judge, Ad Assessor, Internet Crowd Worker, Web Content Assessor and Internet Assessor and Social Media Internet Assessor, these positions are advertised as flexible, telecommuting, temporary work from 10-30 hours per week.[371] Ads, direct email, and robo-commenters abound that say, "Can You Work-at-Home by Surfing the Web All Day? Yes!"[372] Since the positions are advertised as work-at-home jobs, they often target stay-at-home mothers, advertising the positions on Websites like workathomemom,com, telecommutingmommies.com, and baycenter.com. These positions make up Google's search quality evaluation team; but their salaries and working conditions are far from the idyllic conditions on the Google campus. These workers are even required to pay their own expenses for high-speed Internet connections, and to have a smartphone and tablet for their tasks and ever-changing computer technologies. The average salary for these permanent temporary quality raters is between $12-16/hr with no benefits or job security. While their wages are set, payments are based on completion of agreed upon tasks within specific time periods.[373] The positions require employees to have a BA/BS degree or equivalent or 4 years relevant work experience; however, quality raters do not enjoy the prospect of moving up to a full time career at Google or other Internet companies. While their work is tightly connected to the engineers who design Google's algorithm, quality raters do not

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Halina Zakowicz, "Can You Work-at-Home by Surfing the Web All Day? Yes!" *I've Tried That,* February 27, 2013, http://www.ivetriedthat.com/2014/02/27/can-you-work-from-home-by-surfing-the-Web-all-day-yes/.

[371] Julianne Pepitone, "Silicon Valley fights to keep its diversity data secret," *CNN,* November 9, 2011, http://money.cnn.com/2011/11/09/technology/diversity_silicon_valley/index.htm?iid=EL.

[372] Zakowicz, "Can You Work-at-Home by Surfing the Web All Day? Yes!."

[373] See sample job description for Internet Assessor at Lionbridge. http://www.thesmartcrowd.com/workers/job-opportunities/job/internet-assessor-united-states-chinese-language-smartphone-required/.

have any direct interaction with engineers or other workers at the company as they are managed remotely.

The major tasks of quality raters are to evaluate search and/or advertising "relevancy," label spam and flag problem pages as engineers constantly tweak the algorithm. According to *Search Engine Watch*, while the nature of the job for quality raters is presented as flexible and self-directed, it is routinized, mechanized and tightly managed, as the raters perform their tasks based on a 125-page manual of specific guidelines provided by the company. Their task is not conducting search to evaluate search results; rather raters are given a URL and query and are instructed to visit the landing page and score a rating.[374] They rate the URL based on categories that are given such as user intent, location, language, etc.[375]

According to a Google rater in her interview with *Search Engine Land*, raters have to meet their productivity goals in order to stay on the job. She describes the nature of the work and says that there are a certain number of tasks that they have to complete every minute. If they fall behind in terms of "productivity," workers can be put on probation and cannot work during that period. The quality of work for quality raters is tracked based on staying within the time period for rating tasks and the number of tasks that have to be returned.[376] If raters' quality is not up to the company's standard, they are terminated. She offers that, "it's a very controlled work environment."

Quality raters are not exclusive to Google or to search engine companies; rather they are a standardized workforce in many Internet companies, which rely on search as a

[374] Miranda Miller, "How Google's Human Search Quality Raters Assign a URL Rating," *Search Engine Watch*, October 19, 2011, http://searchenginewatch.com/article/2118334/How-Googles-Human-Search-Quality-Raters-Assign-a-URL-Rating.
[375] Ibid.
[376] McGee, "An Interview With A Google Search Quality Rater."

basic function in terms of access and revenue generation.[377] Bing also has a similar program and Microsoft refers to evaluators as "judges" who work under its Human Relevance System (HRS) project, which has been active since 2004 when MSN began generating its own search results.[378] These "judges" perform their tasks based on the 52-page *HRS Judging Guidelines*, but Microsoft is reluctant to discuss their role and very little has been written about their work.[379] Social media company Facebook also directly recruits so called "Entity Quality Raters" whose tasks are described as assessing the quality of Facebook's search results for People, Pages, Games etc.[380]

So far, there are no official numbers on how many quality raters are employed by the search engine industry and other Internet sectors. In 2007, former Google executive and current Yahoo! CEO Marissa Mayer, in a session at the Google scalability conference, said that Google employs more than 10,000 quality raters;[381] however, the company has so far avoided providing exact data. Google's Engineering Director Scott Huffman, who leads the search quality evaluation team, confirmed the existence of the large number of raters who evaluate search relevance across all of the locales in which Google operates.[382] These low wage quality raters collectively constitute a new category of workers and an integral part of the search engine industry workforce. This is but one segment of the massive substrate of low-wage workers. Others include content filterers,

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[377] "Working at Home for Lionbridge – Non Phone Work," *Earn Money Online*, June 13, 2013, http://realwaystoearnmoneyonline.com/2013/06/working-at-home-for-lionbridge-non-phone-work.html.
[378] Matt McGee, "Yes, Bing Has Human Search Quality Raters & Here's How They Judge Web Pages," *Search Engine Land*, August 15, 2012, http://searchengineland.com/bing-search-quality-rating-guidelines-130592.
[379] Ibid.
[380] See Facebook's Entity Quality Rater job description, https://www.linkedin.com/jobs2/view/4934626.
[381] "Google Scalability Conference Trip Report: Scaling Google for Every User," http://www.25hoursaday.com/weblog/2007/06/26/GoogleScalabilityConferenceTripReportScalingGoogleForEveryUser.aspx; Stross, *Planet Google*, 224.
[382] John Paczkowski, "Google and the Evolution of Search I: Human Evaluators," *All Things Digital*, June 3, 2009, http://allthingsd.com/20090603/google-and-the-evolution-of-search-scott-huffman/.

digitization workers, and other outsourced contract workers. So far, the numbers of these low-waged workers have not been tallied. However, perhaps the most telling hallmark of the search industry is its massive reliance on an entirely different and still often overlooked category of labor.

At the Bottom

If quality raters are at the bottom of the hierarchy for wage-labor that supports the search engine industry, there is an even larger workforce that is unwaged: a great mass of labor that is incarnated in Internet users themselves. The search engine industry relies on uncompensated labor – not merely self-service labor that takes over a function that used to be waged, but labor that generates inputs that are appropriated by Google and other information companies without compensation.

The labor that is provided by searchers is more complex than may be thought. Users perform a variety of tasks for search companies as they create content, refine search engines by providing constant feedback via searching, viewing, creating content, networking, rating, and commenting. It is profoundly striking that searchers think that they are receiving "free services," when their labor – in enormous quantities – provides much of the basis of this "free service." As the search engine industry has automated and industrialized, the need for and use of human labor has not been eliminated;[383] on the contrary, it has intensified and changed form, as large-scale commercial search engines have predicated their business models on continuing and ubiquitous inputs made up by searchers. In the process of its expansion, the industry has externalized much of its labor processes by incorporating a large pool of unpaid users. While user labor is not waged labor, it has been visible and valued; in this respect it contrasts with the unpaid domestic

[383] Ibid.

labor which has long been devalued and invisible despite its value to capitalists in allowing them to set below-subsistence wages.[384]

Mainstream media and scholars have recognized the important contributions of users in culture and economy. *Time Magazine* chose "You" – complete with a mirror on the cover – as their person of the year for 2006 by recognizing the millions of people who contribute to YouTube, Wikipedia, Facebook, etc. Many scholars hail user labor as a new and supposedly emancipatory mode of social and cultural production.[385] Yochai Benkler popularized the concept of peer-to-peer production as an alternative to and an improvement over industrial capitalism. He describes this new kind of production as a subset of a commons-based production that "depend on individual action that is self-selected and decentralized, rather than hierarchically assigned."[386] For Benkler, Google's PageRank algorithm is a product of peer-to-peer production, which builds its search ranking through valuing decentralized individual acts of linking to other sites as search engines count those links as "votes of confidence."[387] Benkler claims that this is a new mode of production that resides somewhere outside of the imperatives of capitalist production. Peer production, convergence culture, collective intelligence, and free culture all describe the increasing role of users as part of the "new economy." However, what is striking about these analyses is their common abstraction away from a discussion of labor

[384] Jeanne Boydston, *Home and Work: Housework, Wages, and the Ideology of labor in the Early Republic* (New York: Oxford University Press, 1990), 137.
[385] Henry Jenkins, *Convergence Culture: Where Old and New Media Collide* (New York: New York University Press, 2006); Lawrence Lessig, *Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity* (New York: Penguin Press, 2004); Benkler, *The Wealth of Networks*.
[386] Benkler, *The Wealth of Networks*, 62, http://www.benkler.org/Benkler_Wealth_Of_Networks.pdf.
[387] Ibid., 76.

in relation to capital.[388] Dean Colby succinctly points out that online activity constitutes both means of production *and* social relations; current debates centered around the "new economy" are absent any discussion of labor and capital as a constitutive social relation in order to concentrate solely on changes in the means and techniques of production.[389] Those who view this unpaid user labor as a new phenomenon or as unique to our contemporary information economy have neglected to understand an ongoing, decades-long effort by capital to systematically appropriate unpaid customers' labor in order to augment profits.

For instance, a history of self-service, a common business model, illustrates how portions of the work processes in diverse industries have been transferred to unpaid consumers to increase profit and productivity. While self-service is widespread today in fast food, grocery, banking, post office and other industries, this business model goes back to the early 20th century in the retail industry. With expansion of mass production of food manufacturing, the first self-service chain grocery stores – *Piggly Wiggly* – were introduced by Clarence Saunders in Memphis, Tennessee in 1916. Saunders modeled this self-service grocery store on the cafeteria-style restaurant and reconfigured his store to let his consumers serve themselves.[390] He patented his standardized store floor plan, building fixtures and finishers and franchised Piggly Wigglys across the US.[391] The first principle for Saunders' Piggly Wiggly was uniformity.[392] He insisted that, "every store must do

[388] Dean Colby, "New Media as a New Mode of Production?" in *Knowledge Workers In the Information Society,* ed. Catherine McKercher et al. (Lanham, MD: Lexington Books, 2007), 197-205.
[389] Ibid.,197.
[390] Warren James Belasco and Roger Horowitz. *Food Chains: From Farmyard to Shopping Cart.* (Philadelphia: University of Pennsylvania Press, 2009), 180.
[391] Ibid.,185; Nona Glazer, "Servants to capital: Unpaid domestic labor and paid work," *Review of Radical Political Economics* 16 (1984): 68.
[392] Warren James Belasco and Philip Scranton. *Food Nations: Selling Taste In Consumer Societies* (New York: Routledge, 2002), 166.

everything in exactly the same manner … this is one of the greatest advantages of our system. Clerks, goods, fixtures are interchangeable."[393] Saunders' self-service system was built on standardization and routinization of labor processes so that each could be broken down into a separate task. During WWI, many retailers, facing labor shortages and rising labor costs associated with the war effort, increasingly shifted to self-service.[394] This adoption of a self-service model by industry was not exclusive to the food retail industry. Bell Telephone Company for example started to automate its local phone service after WWI. By 1930, after a long labor struggle, nearly one-third of all telephones in the United States were rotary dial phones which automatically connected local calls, replacing many telephone operators[395] – though the full brunt of the evil combination of automation and self-service in US telephony was felt only beginning in the 1950s and 1960s.[396] Today, self-service principles have been diffused throughout many other retail and service industries, such as home improvement, DIY furniture, ATMs and online banking, pharmacies, airports, online travel ticketing, automated phone systems, print-on-demand publishing, post offices, etc.

The capital logic of self-service is to transfer work from paid workers to the unpaid time of the consumer, which allows firms to cut labor costs by eliminating service workers. Thus, many service industries where consumers and firms interact at the stage of production continue to make an all-out effort to incorporate unpaid consumer labor as

[393] Ibid.
[394] Glazer, "Servants to capital," 69.
[395] Michael William Palm, "Phoning it in: Self-service, telecommunications and new consumer labor" (PhD diss., University of North Carolina, 2010), 23.
[396] Venus Green, *Race On the Line: Gender, Labor, and Technology In the Bell System, 1880-1980* (Durham: Duke University Press, 2001).

a means to improving productivity and lowering labor costs.[397] In the 1970s, service sectors of the economy were on the rise, service businesses were increasingly rationalized and standardized, mirroring the model of mechanized manufacturing industry. The concept of the "production line approach to service" or "industrialization of service," theorized by Harvard economist Theodore Levitt, applied manufacturing logic to consumer service to move consumers to take part in a "production line" as a given automated, standardized and routinized service. In business management literature, the consumer was discovered as a productive resource for corporations.[398] By the early 1980s, business literature had pointed out that productivity would be enhanced when consumers were treated as partial employees and as emerging sources of labor.[399] As consumer participation has become a standard part of the process of service production, customers as employees and employees as customers have become interchangeable slogans in business discourse.[400]

While the methods and levels of utilization of unpaid time of consumers in capital's profit making venture today vary depending on the business – from laboring by simply contributing comments about a service or a product in order to improve quality and quantity for production to completing tasks on behalf of and replacing employees, the

[397] Christopher Lovelock and Robert Young, "Look to Consumers to Increase Productivity," *Harvard Business Review* 57 (May-June 1979*),* http://hbr.org/1979/05/look-to-consumers-to-increase-productivity/ar/1.
[398] Theodore Levitt, "Production-line Approach to Service" *Harvard Business Review,* 50 (September 1972): 41–52; Frank Kleemann, G. Günter Voß, Kerstin Rieder, "Underpaid Innovators: The Commercial Utilization of Consumer Work through Crowdsourcing," *Science, Technology & Innovation Studies*, 4, no. 1 (2008): 5-26.
[399] Peter Mills, Richard Chase, and Newton Margulies, "Motivating the client/employee system as a service production strategy," *Academy of Management Review* 8 no. 2 (1983): 301-10; David Bowen, "Managing Customers as Human Resources in Service Organizations," *Human Resource Management* 25, no. 3 (1986): 371.
[400] Michael Bowers, Charles Martin, and Alan Luker, "Trading Places: Employees as customers, customers as employees," *The Journal of Services Marketing* 4, no. 2 (1990): 55.

use of unpaid consumer labor is radically increasing with the introduction of new information technologies which offer newly direct and comprehensive interactive links between consumers and producers. Capital continues to search for new mechanisms and territories where consumers can be part of the labor process. Capitalism is dynamic and constantly reinventing and reconfiguring labor processes through new technologies, management skills and business models. For decades, the question for capital had been how much value could be extracted from unpaid consumer labor, taking into consideration the cost of incorporating and managing their labor. Yet, the distinctions of today's unpaid consumer labor that is integrated into search is that it involves the appropriation of involuntary as well as freely donated behavior – the capture of users' content, keystrokes, click-throughs and data trails.

Given this increasing role of unpaid workers in the Internet industry, it is insufficient to understand the labor process of search engine industry only through analyzing paid labor. The analysis needs to be extended by relating the search engine industry's incorporation of unpaid labor within the longer historical process by which capital has continually sought to reorganize labor and cheapen its labor costs, among other ways by making greater use of unpaid consumer labor.

User labor as a business imperative

The role of unpaid labor in capital's profit-making has been reignited as Internet technologies have provided a ubiquitous platform to easily aggregate and manage the entire process for a dispersed unpaid user labor pool. From the early stages of the search engine industry, unpaid labor was viewed as a valuable resource and competitive advantage by the industry. Unwaged labor has been not only an integral part of

development of the search engine industry; more importantly it constitutes a new urgent and strategic labor force for the industry**.**

In the 1990s, when Yahoo! was the leading search engine in the market – with its paid human indexed Web directory – NewHoo was launched to compete with Yahoo! under the premise that enlisting a large body of volunteers to compile a Web directory would be more comprehensive than the Yahoo! directory.[401] NewHoo's founders, four Sun Microsystem engineers, noticed that Yahoo! was not able to keep up with the growth of the Web and was struggling to maintain fresh content, and recognized that building a directory was extremely labor intensive and expansive. They discovered their business model in open source software that was being used with little capital investment across the IT industry, and posited that they could apply the open source idea to building a Web directory by recruiting volunteer workers as their main source of labor.[402] As capitalists provided tools for their waged workers, NewHoo provided tools for editing, deleting and updating links to their unpaid voluntary workers who selected, described and organized Websites and added to the directory. By the time NewHoo was acquired by Netscape in 1998, the search engine had compiled 100,000 Websites with over 4500 volunteer editors compared to Yahoo!'s 70 paid editors.[403] NewHoo sold its unpaid worker-built directory to Netscape for $1 million, which promptly renamed it the Open Directory Project (ODP). At that time, ODP already had 1.6 million entries – surpassing Yahoo! – to become the

[401] Danny Sullivan, "NewHoo Becomes Netscape Open Directory," *Search Engine Watch*, December 2, 1998, http://searchenginewatch.com/article/2068092/NewHoo-Becomes-Netscape-Open-Directory; Chris Oakes, "The Distributed Yahoo: 'NewHoo,'" *Wired,* July 8, 1998, from http://archive.wired.com/science/discoveries/news/1998/07/13625.
[402] Angel, *Inside Yahoo!*, 142.
[403] Chris Sherman, "Humans do it better inside the open directory project," *Online*, June 2000, http://www.infotoday.com/online/OL2000/sherman7.html; Angel, *Inside Yahoo!*, 143.

largest, most comprehensive human-edited directory on the Web.[404] All major search engine companies – Lycos, HotBot, Ask Jeeves, Google, AT&T etc. – incorporated ODP to augment their search databases and to get fresh content which allowed them to level the content playing field. When Netscape was acquired by AOL in 1999, the ODP was considered one of the assets included in the acquisition.

Ironically, ODP is often held up by popular media and scholars as one of the best examples of this "new" mode of production occurring outside of the capitalist market. In fact, ODP was initially built with unpaid voluntary labor specifically in order to contribute to a profitmaking investment rather than to challenge capitalist social relations. ODP was firmly rooted in a capitalist market in which unpaid voluntary labor was integrated into and subordinated to a capitalist accumulation project. NewHoo was not the first or only Internet company to deploy unpaid voluntary labor to leverage paid workers. In 1994, a start-up called Geocities was built with a business model based on "community." Geocities provided free Web hosting, suites of utilities and other "Geotools" to its members – called "homesteaders." In exchange, unpaid laborers created content by building Websites focusing on their interests and organizing collections of member Web pages by themes and subjects for Geocities – who then used members' Websites for advertising to generate revenue. Geocities' founders David Bohnett and John Rezner wanted to create a massive amount of content and traffic but on very limited capital. Instead of hiring paid workers, Bohnett and Rezner utilized a "community" based business model as a way to extract labor power from users. Contributing to Geocities' success was its cost-efficient editorial structure, because the most labor-intensive part of

[404] William Aspray and Paul E. Ceruzzi, *The Internet and American Business* (Cambridge, Mass.: MIT Press, 2008), 167.

the work was performed by voluntary unpaid workers who created and maintained their own pages.[405] Bohnett touted that GeoCities "has 75 employees and 900,000 editors,"[406] which meant 75 paid workers along with 900,000 unpaid volunteer workers. The company leveraged the content by unpaid users to generate more market share and more traffic. In 1999, GeoCities was purchased by Yahoo! for $3.57 billion.[407]

The extensive use of unwaged user labor by Internet companies went unchallenged until a group of volunteers at AOL's "Community Leader Program" asked the Department of Labor to investigate whether the company had violated the *Federal Fair Labor Standards Act*. They pointed out that they were treated like any other paid employees – filing time cards, working specific shifts etc. – and therefore should be compensated.[408] AOL, then the largest ISP and a major market actor across the length and breadth of cyberspace, recruited a large number of volunteers as "community leaders" to perform routine tasks – answering subscribers' questions, maintaining chat rooms and offering technical support in exchange for waived or heavily discounted monthly AOL connection fees. At its peak, AOL had up to 16,000 volunteers, including ones as young as 12 years old,[409] outpacing AOL's 12,000 employees.[410] One former executive once estimated that the worth of work performed by volunteers was as much as 30% of the company's annual revenue,[411] and *Forbes* reported that AOL saved almost $1 billion in

[405] Eric Mueller, "Mr. Bohnett builds his dream house," *Upside*, December, 1997: 44-48.
[406] Ibid., 48.
[407] "Yahoo! buys GeoCities," *CNN,* 1999, January 28,1999, http://money.cnn.com/1999/01/28/technology/yahoo_a/.
[408] Elliot Zaret, "Volunteer rebels rock Web community," *ZDnet,* April 14, 1999, http://www.zdnet.com/news/volunteer-rebels-rock-Web-community/102083.
[409] Michael Malone, "The Little People VS. America Online," *Forbes,* February 19. 2011, http://www.forbes.com/asap/2001/0219/060_print.html.
[410] Eliot Zaret, "AOL drops hundreds of teen volunteers," *ZDnet*, July 26, 1999, http://www.zdnet.com/news/aol-drops-hundreds-of-teen-volunteers/102876.
[411] Malone, "The Little People VS. America Online."

expenses from 1992 – 2000.[412] In 2001, the US Department of Labor declined to take any legal action against AOL, reasoning both that the agency lacked resources and that government intervention was "inappropriate" in the dispute between AOL against its volunteers.[413] Later, the group of volunteers filed a class action lawsuit against AOL, and they settled for $15 million.

This brief moment of questioning the use of unpaid volunteer labor within social relationships between labor and capital quickly disappeared, as the Internet sector increasingly became a site of economic growth. The deployment of consumer labor under the "new" economy has been theorized in business literature with neologisms like "co-creation," "co-innovation," and "democratization of innovation."[414] The definition of co-creation or co-innovation here is the creation of value jointly with consumers at the behest of capital. Leading business scholars have started to point out that the future of competition depends on this "new" approach to value creation based on a supposed individual centered co-creation of value between consumers and companies rather than a company-centric value creation.[415] This "new" approach goes beyond earlier forms of self-service such as pumping one's own gas or making a withdrawal from an ATM because unpaid consumers are now actively drawn into capital's profit-making pursuit and participate directly and indirectly in the creation of value.

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[412] David Raymond, "True Value," *Forbes*, February 19, 2001, http://www.forbes.com/asap/2001/0219/060s02.html.
[413] Labor Department won't puruse AOL complaints, *USA today*, October 29, 2001, http://usatoday30.usatoday.com/tech/news/2001/10/29/aol-labor-department.htm.
[414] C.K. Prahalad and Venkatram Ramaswamy, "Co-opting Consumer Competence," *Harvard Business Review*, January 2000; Stefan Thomke and Eric von Hippel, Customers as Innovators: A New Way to Create Value, *Harvard Business Review*, April 2002, https://hbr.org/2002/04/customers-as-innovators-a-new-way-to-create-value/ar/1.
[415] C. K. Prahalad, and Venkatram Ramaswamy. *The Future of Competition: Co-Creating Unique Value with Customers* (Boston: Harvard Business School Press, 2004), 26.

The concept of "co-creation" has become a business mantra: "users must be treated as co-developers" which today lies at the very heart of many Web 2.0 projects.[416] The ubiquitous exploitation of unpaid user labor by internet companies is typically no longer even visible; while its status as labor is effaced, user labor is hailed as typifying a supposed internet-based culture of participation, democracy and so-called "open innovation." Moreover, the incorporation of unpaid voluntary user labor in profit-making has become an increasingly standardized labor process for many Internet companies today. The value of unpaid user labor in improving its competitive advantage has long been recognized by capital whether or not users are aware of it.

Users as Covert Strategic Workforce

Unpaid workers toil side by side paid workers as they perform various tasks. In the case of the search engine industry, companies depend on unpaid user workers for the most capital- and labor-intensive part of their work – providing feedback on algorithms, creation of content, and constant testing of new products. One of the most apparent tasks performed by unpaid workers is providing feedback on search engine algorithms. Users as "co-developers" with engineers assist in the refining of a search engine company's core algorithm technology as they go about their everyday search activities.

Google changes its search ranking algorithm 500 – 600 times annually.[417] While these changes are based on numerous factors, one of the factors is user activity, which signals Google to tune the search algorithm in order to match user queries with context-appropriate advertisements. Currently, Google has devoted roughly one-third of its workforce to research and development. This segment of the workforce has the

[416] O'Reilly, "What is Web 2.0."
[417] "Google Algorithm Change History," *Moz,* http://moz.com/google-algorithm-change.

responsibility for working on the design of information systems including algorithm and new service products. Along with them, Google might have 10,000 paid quality raters, more or less, and an unknown number of paid usability testers, but the largest number of workers who provide constant feedback to improving the algorithm are unwaged users who perform searches everyday. Google's personalized search feature is a good example whereby all Google searches are connected to users' browser cookie records, so that the results are not merely based on the relevance of a Web page to a user's search term, but also on the user's previous search activities. This ratio between paid- and unpaid labor at Google provides a stark contrast as to the enormity of the pool of unpaid labor.

As of January 2013, Google had 170 million unique US visitors per month, with an average of 125 minutes per visitor per month in unpaid labor.[418] This equates to an additional 2,213,542 full time workers for Google (based on the 40-hour work week). These 2,213,542 "people" are not categorized as a productive force in classical economic terms or included in the generation of GDP, but their activities are as vital as the 47,756 full time Google employees (2013 statistics) – if not more so – as their activities contribute directly to Google's revenue generation. Here the ratio between equivalent unpaid users and paid full-time workers is around 46:1. Even if each of these unpaid workers received a salary of $12/hr (the average pay for a quality rater) – or $23,000 per year – it would cost Google an additional $51,000,007,680 in salary each year. This is almost the equivalent of Google's 2013 global revenue of $59.83 billion. In other words, Google would not be the grossly profitable company it is without these unpaid users.

[418] "January 2013: top U.S. entertainment sites and web brands," *Nielsen Newswire*, March 22, 2013, http://www.nielsen.com/us/en/insights/news/2013/january-2013--top-u-s--entertainment-sites-and-web-brands.html.

Google's astronomical success and profit generation have been predicated on its wholesale incorporation of unpaid user labor into its business model. The role of unpaid labor in profit-making for the search engine industry is not a secret. In 2005, Microsoft Chairman Bill Gates somewhat ironically pointed out that Google doesn't share ad revenues with end users who help them get the revenue, saying, "Google keeps all of the money with [sic] itself."[419]

While algorithms are central to search engine businesses, they cannot be effective without a large quantity of fresh content to index and deliver to users and advertisers; thus generating original content has long been a major capital- and labor-intensive task for search engine businesses. For this, companies again rely heavily on user labor in creating, uploading, and commenting supplemented with acquiring proprietary content and partnering with content providers like NBC Universal, Sony Pictures, and Disney.

Take Google's YouTube site for instance. In 2013, YouTube handled more than 1 billion unique users each month – the third most-visited site on the Web after Google search and Facebook and the world's largest video sharing platform.[420] As of 2014, according to Google's own statistics, 100 hours of video are uploaded to YouTube every minute, over 6 billion hours of video are watched each month, almost an hour for every person on Earth.[421] Google has discontinued provision of data on users' social actions (likes, shares, comments) on YouTube, but its last statistics in February of 2013 showed that 100 million people took some sort of social action on YouTube (likes, shares, comments, etc.) every week, and more than 50% of videos on YouTube have been rated

[419] John Ribeiro, "Microsoft to show search engine users the money," *InfoWorld,* December 8, 2005, http://www.infoworld.com/t/platforms/microsoft-show-search-engine-users-money-619.
[420] Nathan Olivarez-Giles, "YouTube hits 1billions monthly users," *Wired*, March 21, 2013, http://www.wired.com/2013/03/youtube-1-billion-monthly-users/.
[421] "YouTube Statistics," http://www.youtube.com/yt/press/statistics.html.

or include comments from the user community. Google's YouTube unit has only 700-900 full-time workers despite the enormous scale of the site and the massive workload to improve functionality and interface, upload new content, and increase its revenue.[422] The reason Google is able to assign a relatively small number of workers considering this amount of work is because of the more than 1 billion monthly unique visitors assisting them.

Google is one of the industry trendsetters for its creative deployment and exploitation of user labor. The company has introduced its so-called beta business model – which mirrors the open-source community's bug fixing approach – in which its products are released incomplete and during development. At Google, their motto is: "launch early and iterate,"[423] which means that the iterations process relies on work by users to assist Google in perfecting its products. A product would normally be tested by paid workers or internally by Googlers, but Google has decided to release its products to large numbers of users perpetually in beta versions. According to Jeff Jarvis, this is Google's way of saying, "there are sure to be mistakes here and so please help us find and fix them and improve the product" as the company monitors user activities to see how new "free" products and services are used and which features are rejected and adopted.[424] As Tim O'Reilly points out, "it's no accident that services such as Gmail, Google Maps, Flickr, del.icio.us, and the like may be expected to bear a 'Beta' logo for years at a time."[425] The logic behind releasing "perpetual beta" products is not as a

[422] Andrew Morse and Ian Sherr, "YouTube to Boost Staff by 30% This Year," *Wall Street Journal*, March 10, 2011, http://online.wsj.com/article/SB10001424052748704399804576193044126399836.html.
[423] "A fresh take on the browser," *Google Official Blog*, September 1, 2008, http://googleblog.blogspot.com/2008/09/fresh-take-on-browser.html.
[424] Jeff, Jarvis, *What Would Google Do?* (New York, NY: Collins Business, 2009), 93.
[425] O'Reilly, "What is Web 2.0."

technical experiment; rather it is a business strategy to transfer part of the work to unpaid user labor. This business approach carries on the 20th century's corporate welfare capitalism in which exploitation is cloaked in typically paternalistic corporate initiatives aimed at showing "we care." The deployment of welfare capitalism in Internet industry will be discussed in more detail in the following chapter.

It is vital to add that the search engine industry built over the Internet is able to tap into user labor across national boundaries. Many Google products (Google.com, Blogger, Google Earth, and others) are currently available in more than 170 languages, from Abkhazian to Zulu. Most of these translations are done by volunteers from around the world, as the company encourages them to participate by creating and using translation programs and providing tools to perform this task. Google maps also uses volunteers from various countries who post updates on their neighborhoods or travel to remote places to map the area before uploading their findings to Google Map Maker. In particular, in the countries where there is little Web content to index and monetize, Google has launched volunteer programs to create and translate content. Imagine how many paid translators and cartographers Google would need to perform all of these myriad tasks. Instead of waged-workers, Google is taking the old but familiar "community" based business model in which work can be transferred to unpaid voluntary labor. This "community" as covert strategic labor has been a vital workforce for the industry's survival, development and transformation of search engine technologies into one of the most dynamic information industries.

There are several remaining questions to be answered: why are people willing to perform voluntary work for Google and the other Internet firms? Users are not merely

performing work on behalf of Google's business. Their everyday information activities are also rewarding in and of themselves for entertainment, communication, work, education, building social reputation, and meeting information needs. Given that users get benefits from commercial Internet services, some might argue that users are willing to trade their labor in exchange for "free" services. The question then needs to be shifted from "why?" to "what price?" The price to pay for users to use those services is to live in a constant state of surveillance in which their moves are being gathered, monitored, extracted, and analyzed for corporate gain and beyond. Is this a fair trade for users? The absence or lack of public information provision offers few choices for the public. This then leads to the next question. Since not all Internet activities can be deemed labor to assist capital, what percentage of Internet users' activities are directly put into profit-making? Given the complexity of the labor processes, is it possible to even calculate?

The search engine industry is built on the work of a mass of people whose labor is the basis of its business. Unpaid labor is not new; rather, it has always been part of the capitalist system – women's labor, slave labor, prison labor, child labor, and today's increasingly unpaid interns. Yet, what is new in the search engine industry is that the sheer scale of voluntary and non-voluntary unwaged labor appropriated by capital and the directness of its incorporation into profit-making projects and its strategic urgency for capital are historically unprecedented. The profitability for the search engine industry rests on the appropriation of unpaid user labor. Today, the deployment of user labor in search engine companies and other Internet companies is no longer a choice; rather it has become a business imperative. Concomitantly, there is no longer even a choice for users

to bypass laboring for the Internet firms as Internet activities are fabricated into our everyday lives.

The search engine industry is perceived as charting a path forward for the "new" information economy, which generates a large quantity of highly skilled workers where workers are not exploited but rather are empowered, highly-paid and engaged in creative work. The information-based economy is viewed as the driving force behind the prosperity of workers and the building of a more egalitarian society. Yet, as demonstrated, the actual emerging labor structure and organization of the search engine industry offers us quite a different picture. The next question that I will examine is how the search engine industry controls its workers? In the following chapter, I explicate how both paid and unpaid workers are being managed in the search engine industry.

Chapter 4

Digital Welfare Capitalism

In the era of the industrial economy, the distinct characteristic of labor management is the "scientific" management approach – or "Taylorism" after the works of Frederick Taylor – where workers are tightly controlled and tasks are highly automated and mechanized. Along with Taylorism, industrial capitalists have also experimented with other paternalistic methods of labor control by providing some private welfare programs and improving working conditions as a way to curtail the tension between labor and capital and kill labor unions. Yet, since the 1970s, post-industrial theorists have suggested that the new information-based economy that has brought about the structural transformation of capitalism bears different forms of labor control and management practices.[426] Rather, in the "new" economy, they argue that capitalists will move away from old forms of labor control techniques as workers become more empowered, have more control over their work processes and working conditions, and become more involved in the production process. Ultimately, they predict that there will be fundamental shifts in the amount of control workers have.

Yet, the search engine industry that represents the information-based economy illustrates that seemingly participatory and democratic approaches to labor management are firmly ingrained in the historical tradition of capitalist labor control. This chapter discusses the specific modes of management employed by the search engine industry to both paid and unpaid labor – modes that facilitate the expansion of capital. It focuses on the organization of labor within the search engine industry – in particular within and

[426] Daniel Bell, *The Coming of Post-Industrial Society: A Venture In Social Forecasting* (New York: Basic Books, 1973); Alvin Toffler, *The Third Wave* (New York: Morrow, 1980).

around Google – and sheds light on how work and workers are structured within the longer history of labor management.

Workers' newly found Paradise?

Organic gardens, cafes, swimming pools, onsite doctors, day care, free haircuts, 24/7 fitness centers, yoga and meditation classes, Wi-Fi enabled commuter shuttles with private guards, are all part and parcel of the Googleplex. Googleplex – its 4 million square feet or the equivalent of about 40 Home Depot stores[427] – occupies a suburban landscape within sunny Silicon Valley. This hardly looks like any workplace that one could imagine. Google made a name for its search business but is also known for its "unconventional" working environment and management style. For several consecutive years running, *Fortune Magazine* has named Google the best place to work in the US, and for many young professionals, the company has been perceived as an icon of the idealized workplace.

With "Passion not Perks" as its corporate motivational tagline, Google is famous for its 20% time program, where its engineers are allowed to spend one day a week working on projects they are passionate about but which are not in their job description.[428] This is one of the known aspects of the company's "innovative" policy. Apple followed Google's footsteps and launched its own version of Google 20% time,[429] allowing its employees to take two weeks to work on projects outside their normal

[427] Mike Swift, "Google's growth online reflected by expansion in Mountain View," *San Jose Mercury News*, November 11, 2010, http://www.mercurynews.com/breaking-news/ci_16586782?nclick_check=1&forced=true.
[428] "Google's "20 percent time" in action," *Google Official Blog,* http://googleblog.blogspot.com/2006/05/googles-20-percent-time-in-action.html.
[429] Matthew Panzrino, "Apple fires up its version of Google's '20% time', giving some employees 2 weeks for special projects," *TNW*, November 12, 2012, http://thenextWeb.com/apple/2012/11/12/apple-fires-up-its-version-of-googles-20-time-giving-some-employees-2-weeks-for-special-projects/; Jay Yarow, "Tim Cook Is Giving Apple Employees Two-Week Breaks To Work On Special Projects," *Business Insider*, November 12, 2012, http://www.businessinsider.com/apple-tries-20-time-2012-11#ixzz2GUS5dwtU.

responsibilities. Yahoo!'s CEO Marissa Mayer, is attempting to emulate Google by offering free food and an iPhone to Yahoo! workers and changing the layout of the workspace to revitalize the company.

At Google, employees seem to have their own autonomy, and are able to pursue their curiosity and inspiration. Google management has embedded the Maker/DIY ethos that encourages experimentation and technology play for their own sake – and is presented as if it were an alternative to capitalist pursuits – into the Googleplex. The company has often been portrayed by media as an intellectual playground, a relaxed and informal workplace that fosters creativity and innovation. Instead of a bureaucratic, hierarchically controlled structure, the company has become known for its flat, open organization and its bottom-up approach to its management as it promotes employee participation and democratic decision-making. Mission, transparency and voice are ostensibly the main components of Google's corporate culture. Google's success has often been attributed to its "unique" management style that distinguishes Google from its more traditional and bureaucratic counterparts.[430]

Google's seemingly idyllic culture and exciting and fun working environment are unthinkable for the majority of workers today who are barely clinging to their jobs and facing radical reductions in pensions, and health benefits.[431] Google's showering of its

[430] Stefanie Olsen, Google vs. Yahoo: Clash of culture, *CNET,* June 20, 2005, http://news.cnet.com/Google-vs.-Yahoo-Clash-of-cultures/2100-1024_3-5752928.html; Karl Moore and Kyle Hill, "The Decline but Not Fall of Hierarchy -- What Young People Really Want," *Forbes*, June 14, 2011, http://www.forbes.com/sites/karlmoore/2011/06/14/the-decline-but-not-fall-of-hierarchy-what-young-people-really-want/; Reena Jana, "Case Study: Yahoo!'s Hot Innovation Incubator," *Bloomberg Business Week*, November 15, 2007, http://www.businessweek.com/stories/2007-11-15/case-study-yahoo-s-hot-innovation-incubatorbusinessweek-business-news-stock-market-and-financial-advice.

[431] Daniel Gross, "Goodbye, Pension. Goodbye, Health Insurance. Goodbye, Vacations," *Slate*, September 23, 2004,

workers with a whole host of benefits, services and amenities seems unfamiliarly new to many ordinary workers, and even anti-capitalistic. Yet, not that long ago, there was a time in American history when corporations forged the paternalistic labor management style of so-called welfare capitalism in response to the rise of workers' unions and labor unrest in the late 19th and early 20th centuries.

Around the turn of the 20th century, National Cash Register (NCR), located in Dayton, Ohio – considered the Silicon Valley of its day[432] – was known for its lavish welfare programs for workers. NCR, which produced the first mechanical cash registers, was a symbol of the era of commercial automation at that time.[433] The company started the first sales training school and offered unprecedented internal private welfare programs providing lunchrooms, lending libraries, free child care, paid education, onsite medical services, sponsored retreats, musical concerts, and neighborhood programs for its employees.

NCR's new style of management was seen to be a transformative moment of capitalism, strikingly distinguished from Taylorist techniques in which workers were treated as part of the factory's machines, watched by foremen and tightly controlled. However, NCR's seemingly generous employee benefits then were not based on altruistic motives and did not indicate a change in fundamental social relations between capital and labor. Rather this new-at-the-time management technique was motivated by capital's serving of its own long-standing interests. John Patterson, the President of NCR, bluntly

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http://www.slate.com/articles/business/moneybox/2004/09/goodbye_pension_goodbye_health_insurance_goodbye_vacations.html.

[432] Philip Dray, *There is power in a union: The epic story of labor in America* (New York: Doubleday, 2010), 230.

[433] Ibid.

admitted that improving workers' lives would boost the company's business interests.[434] He was known for posting signs throughout NCR shops saying, "It Pays" [435] and claiming to his employees that, "While it is the duty of the company to show to its people that it is not a corporation without a soul, it is fair for the people to show … that they too have a soul, a spirit which responds to considerate treatment."[436]

Labor historians refer to this more "humane" labor management that emerged in the late 19th century as welfare capitalism, or industrial paternalism, which gave workers a variety of employment benefits including pensions and stock shares as part of a larger strategic business management. The objective of industrial paternalism was to gain competitive advantage by fostering loyalty and dedication among workers.[437]

For instance, Ford Motor Company developed a sophisticated experimental industrial welfare program. Henry Ford found that productivity did not increase as much as he had expected after he mechanized and transformed production processes by employing assembly production lines.[438] The company was still suffering from instability and a high workforce turnover rate. In 1913, Ford's plant in Detroit had a turnover rate of 370%.[439] Ford discovered that productivity and efficiency on the factory floor were affected by "human elements" as much as machinery. Thus, along with the introduction of mechanized assembly lines and new technical machinery, the company experimented

[434] Cindy Aron, *Working at play: A history of vacations in the United States* (New York: Oxford University Press, 1999), 194.
[435] Roland Marchand, *Creating the corporate soul: The rise of public relations and corporate imagery in American big business* (Berkeley: University of California Press, 1998), 17.
[436] Ibid.
[437] Phanindra Wunnava, *The changing role of unions: New forms of representation* (Armonk, New York: M.E. Sharpe, 2004), 69.
[438] Evelyn Cobley, *Modernism and the culture of efficiency: ideology and fiction* (Toronto [Ont.]: University of Toronto Press, 2009), 54.
[439] Robert Zieger, Timothy Minchin, and Gilbert Gall, *American workers, American unions: the twentieth and early twenty-first centuries* (Baltimore: Johns Hopkins University Press, 2014), 11.

with internal welfare programs in an effort to solve the human elements, the so-called "labor problem." They extended control of labor processes beyond the factory floor by instituting various welfare programs such as savings options, health care, and profit sharing.

One of Ford's famous programs rooted in welfare capitalism was the five-dollar-a-day plan with a reduction of the working day from nine hours to eight, which shocked the world because it was double the average wage at that time, making Ford workers better paid than in any other industry.[440] Ford's five-dollar-a-day program had two functions, both aimed at solving capital's immediate problems. Since mass production requires mass consumption, this was a way to generate higher consumption of automobiles by raising worker's wages. The other function was using the program to control workers' social behaviors beyond the factory floor.

The five-dollar-a-day wage was not just given to workers as fair wages; rather it was used as a reward system to intervene in workers' private lifestyles to fit into the mechanized factory work environment for mass production. In order for workers to earn five dollars per day, workers had to qualify by meeting particular behavior criteria established by the company. To tackle these tasks, Ford established a Sociology Department at Ford's Highland Park facility in Detroit where the company conducted investigations on workers by detailed monitoring of private lives to administer the five-dollar-a-day program. By 1919, the department had hired hundreds of investigators who visited workers' homes, talked to workers and documented their spending habits,

[440] Beth Tompkins Bates, *The Making of Black Detroit In the Age of Henry Ford* (Chapel Hill: University of North Carolina Press, 2012), 23.

cleanliness, sobriety, etc.[441] After gathering data on workers' private lives, the sociology department used those data to monitor behavior of workers and determine eligibility for the five-dollar-a-day program. In fact, Ford extended its management "beyond the purely technical realm to the broader social and cultural ones of values and forms of behavior."[442] As capital extended its control to workers' social and private lives and recognized a "human element," there was an increasing interest in social and behavioral science by corporate America in order to understand the conditions under which workers were most efficient and productive.

The industrial research at Western Electric Company, a subsidiary of American Telephone & Telegraph (AT&T*)* at the Hawthorne Works, in Cicero, Illinois was one of the landmark attempts in social and behavior science experiment introduced to the factory floor on a large scale in order to investigate the relationship between productivity and working conditions and to solve once and for all the "labor problem." Western Electric was one of the leading companies to endorse welfare capitalism from early on, and refined its approach over time. By the mid-1920s, the company offered a pension system, stock options, and a benefits package, opened a hospital and medical department, and established a Hawthorne Club as the center of workers' social activities – concerts, classes, sports competitions, club store, and beauty contests.[443] In order to administer and manage their various welfare programs, Western Electric established a centralized personnel management department. By implementing formal systems of personnel management practices in terms of recruitment, discharge, promotion, and benefit

[441] Greg Grandin, *Fordlandia: The Rise and Fall of Henry Fords' Forgotten Jungle City* (New York: Picador, 2010), 38.
[442] Stephen Meyer, *The Five Dollar Day: Labor, Management, and Social Control In the Ford Motor Company, 1908-1921* (Albany, N.Y.: State University of New York Press, 1981), 96.
[443] Gillespie, *Manufacturing Knowledge*, 19.

programs, the company innovated bureaucratic techniques and asserted power over a large workforce for mass production. This emergence of personnel management – an essential feature of welfare capitalism – drew social and behavioral science on to the factory floor.

The plant brought in Harvard professor Elton Mayo and his research team – including Fritz Roethlisberger from the Harvard Business School and Clair Turner from the Biology and Public Health Department at MIT – to conduct research on a team of six women relay assemblers under various working conditions. They ran numerous experiments with different variables such as rest periods, shift hours, and length of working day and week to measure their relationship to workers' efficiency and productivity.[444] Mayo's research team conducted more than 20,000 interviews with workers and collected data not only on workers' attitudes toward the organization and personnel policies but also individual personalities of workers and individual adjustments to working and social conditions as the researchers applied their backgrounds in psychology, sociology, and anthropology.[445]

According to Mayo's research team, workers' productivity increased with the improvement of the working environment; but also productivity continued to increase even if special improved working conditions were removed. Their research claimed that workers' attitudes and motivation toward work, and their morale could be more important than their physical working conditions in increasing efficiency and productivity. The so-called "Hawthorn Effect" posits that productivity and performance are improved when workers feel like they are receiving attention and that their employers care about them.

[444] Gillespie, *Manufacturing Knowledge.*
[445] Stephen Adams, and Orville R. Butler, *Manufacturing the Future: A History of Western Electric* (Cambridge: Cambridge University Press, 1998), 127.

This research, which has been seen as "objective" science and canonical in management literature, ignored the political nature of the Hawthorne Works experiments themselves and the very interconnection between science and corporate interest.[446]

Resting on Mayo's research, corporations began to design diverse new means of control as many companies attempted to change workers' attitudes by experimenting with participatory decision-making, group dynamics, and "worker centered" approaches. They pursued the control of labor through consent rather than coercion, more standardized benefit programs and professional management practices to engineer workers' subjectivity and deter them from joining national unions.[447] The legacy of the Hawthorne experiments shows that science is deployed to justify and mask capital's interests in a system of paternalistic welfare capitalism.[448]

These industrial forms of labor management based on welfare capitalism seemed to disappear during the great Depression; however, historian Sanford Jacoby shows that while welfare capitalism was indeed curtailed by the Depression, it was never eliminated. Rather, he argues that welfare capitalism had to be reshaped and modernized between 1930 and 1960 to grapple with both industrial unionism and ascending state welfare programs. This new phase of welfare capitalism was supplemented by government programs, and distinguished from earlier versions as capital sought to establish a "kinder, gentler sort of paternalism" which emphasized consent rather control.[449]

Current labor management practices of Internet firms like Google – with corporate slogans like job enrichment, quality of work life, and participatory management

[446] Gillespie, *Manufacturing Knowledge*, 95.
[447] Jacoby, *Modern Manors*, 32.
[448] Gillespie, *Manufacturing Knowledge*.
[449] Jacoby, *Modern Manors*, 5.

– seem innovative but they are deeply rooted and need to be situated within the continuing history of welfare capitalism as a form of labor control by management.

Welfare Capitalism 2.0

With growing competition and rapidly changing markets and technologies in the search engine industry, a steady stream of engineers and other professional workers who may be tasked with immediate and strategically imperative work objectives is considered vital. Borrowing Luc Boltanski and Eve Chiapello's term, this class of workers can be described as "cadres" – young, educated, technical experts of high social status, "whose support for capitalism is particularly indispensable for running firms and creating profit."[450] Boltanski and Chiapello found that "they aspire to share decision making power to be more autonomous, to understand managerial policies, to be informed of the progress of business."[451] In the search engine industry, the cadres are the small segment of software engineers, financial analysts, project managers and other related professionals described in the previous chapter – many of them belonging to the managerial class and/or possessing the mobility to climb the social ladder.

Given this, capital instills a management technique that rests on an ethos of premium corporate paternalism, autonomy, flexibility, non-hierarchy, and participation. Cadres are not constrained or disciplined by traditional hierarchical structures and strict behavior rules; but they are expected to take initiative, to be self-starters, and to engage in a rigorous and creative form of discussion where decisions emerge among employees.[452]

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[450] Luc Boltanski and Eve Chiapello, *The New Spirit of Capitalism* (London: Verso, 2005), 14.
[451] Ibid., 64.
[452] Gideon Kunda, *Engineering culture: control and commitment in a high-tech corporation* (Philadelphia: Temple University Press, 1992), 90.

Capital encourages these abstract behaviors to provoke creative, innovative, and self-motivated, entrepreneurial risk-taking.[453]

Boltanski and Chiapello call these new qualities of labor management the new spirit of capitalism, "the ideology that justifies people's commitment to capitalism, and which renders this commitment attractive."[454] The notion of these non-hierarchical, autonomous, and participatory capitalist firms may seem antithetical to capitalist management; however, the majority of cadres are socialized into its capitalist business values, and their participation remains circumscribed by capital's profit goals. Thus, it is far from truly being autonomous or participatory in the sense of being fully independent or worker control of the ownership structure.

Under the moral tone of "Do no evil" and "organizing the world's information," Google triumphantly presents its endeavor as a worthwhile alternative opportunity. Its slick leaders – Larry Page, Sergey Brin and Eric Schmidt – are far from tyrannical in their public images. They are portrayed more as freedom fighters who challenge and revolt against oppressive regimes – such as China and Cuba – as defined by the US government. For young cadres, working for such a search engine firm, whose main business is information access, this seems to offer an uncompromised opportunity where working for capital and pursuing the public good are completely compatible. With the rhetorical façade of democracy, freedom of information and human rights, Google develops global common values that not only motivate and drive its employees, but extend out to attract intellectuals, activists, and the public to sympathize with its

[453] Ibid.
[454] Luc Boltanski and Eve Chiapello, "The New Spirit of Capitalism" (paper presented at the Conference of Europeanists, Chicago, IL, March, 14-16, 2002), http://www.frontdeskapparatus.com/files/boltanskiNewSprit.pdf.

enterprise. As its employees internalize these values – share them – Google has no need to use rigidly strict control management techniques. As Richard Edwards points out, "the most sophisticated level of control grows out of incentives to workers to identify themselves with the enterprise, to be loyal, committed and thus self-directed and self-controlled." [455]

Unlike industrial factory firms that exploit every ounce of a worker's labor to increase profits, Google is often praised as an exceptional company having the utmost care for its employees in mind. The company has long been known for taking care of its workplace and everything within its employees' lives – from meals to laundry to death benefits that include paying the spouse or domestic partner of the deceased 50% of their salary for 10 years. The question raised at this point is: if the 19th century's corporate welfare program was created to control labor, curtail labor unions and government intervention, then what is the motivation behind Google renewing and expanding employee benefits when there are few labor unions and scarce threats of government intervention? Why do companies like Google spend so much money on employee benefits? Some might think that the exploitative nature of capitalist systems has given way and that the "new economy and benign capitalism is truly possible;" yet, Google's management techniques illustrate that the "new economy" carries characteristics of a supposedly bygone era of welfare capitalism. Why – in response to what threat or compulsion?

100 years ago, NCR's president John Patterson said about his company's welfare program that "it pays," and similar practices have been paying off for Google as well.

[455] Richard Edwards, *Contested terrain: the transformation of the workplace in the twentieth century* (New York: Basic Books, 1979), 150.

The company generates $931,657 in revenue *per worker*, 170% higher than Yahoo!'s $344,758 in revenue generated per employee.[456] Laszlo Bock, Google's VP of People Operations, described it thusly "The important thing to note is that you don't need a lot of money to do what Google has done. If you give people freedom, they will amaze you."[457] Thus, seemingly over-the-top lavish perks and freedom – to be sure, only for Google's most elite employees – are not contradictory to capital logic; rather, they closely align with capital accumulation by bringing cadres into the Google enterprise and are a successful way of hiring and managing a highly skilled workforce. Google's welfare capitalism is a strategy based on economic self-interest aiming to secure the enthusiastic and intensive labor of the most highly talented engineers, programmers, and managers in the world – a scare commodity, easily lured away by competition.

Google's different mode of management is commonly exemplified by the company's provision of free gourmet food for its employees receiving positive press coverage. While corporate free food programs are not new, Google seems to have brought them to a different level by offering to executives as well as all employees local, fresh and organic meals – 3 times a day – cooked by top chefs and catering to the international regional tastes of its employees. This kind of free food program has often been portrayed as Google's genuine exceptionalism; yet, this is part and parcel of the company's management strategy. In fact, the real objective has stemmed from the service of corporate interest. A Google executive once stated that the company's free meals

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[456] Daniel Honan, "Marissa Mayer's Guide to Being Productive: It's About Data, Not Politics," *big smarter think fast,* February 28, 2013, http://bigthink.com/think-tank/marissa-mayer-work-from-home.
[457] "Interview with Laszlo Bock, VP, People Operations at Google," *Spice Mentor*, May 19, 2008, http://spicementor.blogspot.com/2008/05/if-you-give-people-freedom-they-will.html;
Susan Gargoyle, "How employee freedom delivers better business," *CNN*, September 21, 2011, http://edition.cnn.com/2011/09/19/business/gargiulo-google-workplace-empowerment/.

program is a way to increase productivity; workers do not leave their workplace for meals, which means extending working hours.[458] Joe Labombarda, the executive chef at Google's Manhattan office admitted, "the unlimited free food supply was originally designed to maximize productivity and loyalty."[459] At the turn of the last century, free lunch, with the idea that well-fed workers were more productive, embodied corporate paternalism.[460] Google's free food is not a "perk" – it is part of a productivity maintenance strategy.

And free food is not the only management strategy that Google uses to increase productivity. Eric Schmidt blatantly put forward his control technique in order to increase productivity in the Google workforce:

> The goal is to strip away everything that gets in our employees' way… We provide a standard package of fringe benefits, but on top of that are first-class dining facilities, gyms, laundry rooms, massage rooms, haircuts, car washes, dry cleaning, commuting buses – just about anything a hardworking employee might want. Let's face it: programmers want to program, they don't want to do their laundry. So we make it easy for them to do both.[461]

He presents this idea as if the purpose of these generous benefits is truly to look after workers' personal growth and their interests, but by "stripping away everything," Google extends employees' working hours by reducing any work interruption and stoppage. In his interview with McKinsey & Company, Inc., a management consulting firm, Schmidt also revealed how the company manages productivity and intensity of work, stating:

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[458] Sara Kehaulani Goo, "At Google, Hours Are Long, But the Consommé Is Free," *Washington Post*, January 24, 2007, , http://www.washingtonpost.com/wp-dyn/content/article/2007/01/23/AR2007012300334.html.
[459] Juju Chan and Mary Marsh, "The Google diet; Search Giant Overhauled its Eating Options to 'Nudge' Healthy Choice," *ABC News*, http://abcnews.go.com/Health/google-diet-search-giant-overhauled-eating-options-nudge/story?id=18241908#.UUwJkRn1dyU.
[460] Nikki Mandell, *The Corporation As Family: The Gendering of Corporate Welfare, 1890-1930* (Chapel Hill, N.C.: University of North Carolina Press, 2002), 23.
[461] Joe Mont, "Here's The Real Reason Your Employer Loves Giving Perks," *Business Insider,* August 31, 2011, http://articles.businessinsider.com/2011-08-31/strategy/30092971_1_employees-perks-executive-compensation.

> You need two things. You have to have somebody who enforces a deadline. In a corporation the role of a leader is often not to force the outcome, but to force execution. Literally, by having a deadline. Either by having a real crisis or creating a crisis. And a good managerial strategy is "let's create a crisis this week to get everybody through this knot hole."[462]

Under industrial capitalism, the speed and intensity of work were coded into new machineries that set the pace of work for working class labor. While Google does not use machinery in a 19th century sense, it does resort to psychological manipulation – techniques of labor control stemming from the early 20th century.

Moreover, Google is trying to extend its control over employees' lives beyond the Google "campus" just as Ford Motor Company had pioneered in the early 20th century. In 2003, Google proposed and pressured the Mountain View city council to build employee housing and a hotel and conference complex within proximity to the Google campus.[463] Pursuing the project, Google real estate chief David Radcliffe wrote in a letter to city officials that the company's goals were to build a headquarters that would be "nurturing and regenerative to the environment, provide a vibrant community and work/life balance for all."[464] Google envisions constructing a company town – a modern day company town following in the footsteps of Pullman, IL or McDonald, OH – and corporate culture where there are no boundaries between work and private lives and employees will have no reason to leave the Google "campus." By blurring the lines between work and private lives under the name of providing a "vibrant" community, the company does not need to deploy a traditional tightly controlled management mechanism to extend workers' working hours; rather, Google intends to reshape workers' lifestyles and physical

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[462] James Manyika, "Google's view on the future of business: An interview with CEO Eric Schmidt," *The McKinsey Quarterly*, November 2008, 5.
[463] Mike Swift, "Google envisions its own town," *Seattle Times,* November 21, 2010, http://seattletimes.com/html/businesstechnology/2013485338_googlerealestate22.html.
[464] Swift, "Google's growth online reflected by expansion in Mountain View."

environment in order to motivate workers to voluntarily put in longer hours at work and stay loyal to the company.

While Google's housing proposal was opposed by the Mountain View City Council and the company had to drop its plan for the time being, Google has been expanding its physical footprint since 2011, spending 600 million dollars to acquire buildings in suburban Silicon Valley. Google is also constructing its ambitious new corporate campus by adding a 42-acre section of NASA's Moffett Field – a former US Naval air station – through a long-term lease contract with the federal government. While detailed information is hard to come by, the new mega campus is supposed to have nine buildings surrounded by a quad, piazza, garden and contemplative space.[465] This time, Google is embracing nature into its corporate strategy. Google's new corporate structure is close enough to a wetland that Google has promised to use only 5 percent of the land for new office space, reserving 15 percent to wetland restoration areas. The company confidently said that Google will provide employees access to the wetlands, which it sees as a "potential source of inspiration and education."[466]

Google's "unorthodox," "worker-centered" and "democratic" management strategies are typically equated with its overall approach; yet, this is not the entire picture. On one level, Google embraces a "care-free" or "hands-off" approach to managing its elite employees, seemingly with little direct control over labor processes and moving away from industrial forms of labor control; but on another level, it has adapted a form innovated by Western Electric – a method built on data for managing its workforce.

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[465] Nathan Donato-Weinstein, "More details on Google's new ultra-green, bike-friendly Bay View campus," *Inside Silicon Valley Business Journal***,** May 30, 2013, http://www.bizjournals.com/sanjose/news/2013/05/30/more-details-on-googles-new.html?page=all.
[466] Ibid.

Google by Design

Few will question that the search engine business is driven by data, but it is less well-understood that this extends to the management of its workplace as well. Data is an integral part of Google's organizational culture. Google calls its human resources department "People Operations (POPs)," and manages all aspects of its employees' lives. POPs operates under the principle that "*All people decisions at Google are based on data and analytics.*"[467] POPs distinguishes itself from the traditional HR department, asserting that "everything has been researched and is backed up by data." If Ford had its sociology department and Western Electric had Mayo's research team, Google has POPs where scientists collect detailed data on workers' behaviors and activities. On Google's own blog, they state, "we apply science to organizational issues as well."[468] Google's POPs – a team of scientists and researchers working on the development of management – is the place where science and HR meet.[469] Google claims that the company wants its HR to emulate a science lab where everything is observed, tested and measured – even down to employees' emotions.

A Google spokesperson, Jordan Newman, once proudly alluded to Google's overarching management principle in a *New York Times* interview, "to create the happiest, most productive workplace in the world."[470] While we have seen how it links workers' happiness to productivity – and this has been broadly embraced by business

[467] Ciara Bryne, "People analytics: How Google does HR by the numbers," *Venture Beat*, September 20, 2011, http://venturebeat.com/2011/09/20/people-analytics-google-hr/.
[468] Jennifer Kurkoski, "Hello science – meet HR," *Google Research Blog*, http://googleresearch.blogspot.com/2012/06/hello-sciencemeet-hr.html.
[469] "Inside Google's Culture of Success and Employee Happiness," http://blog.kissmetrics.com/googles-culture-of-success/.
[470] James Stewart, "Looking for a Lesson in Google's Perks," *New York Times*, March 15, 2013, http://www.nytimes.com/2013/03/16/business/at-google-a-place-to-work-and-play.html?pagewanted=all&_r=0.

practices and business literature[471] – Google also resorts to intensive data to ensure workers' happiness. Google scientists are experimenting on employees to determine how to maximize their happiness. The company has established the People Analytic team within POPs to observe and measure the emotional states of employees and thoroughly analyzes employees' satisfaction to benefits, perks, salary, talent management, hiring and various aspects of employees' lives in order to tune their management.

Slate Technology columnist Manjoo Farhad corroborates this by showing how Google uses its employee data tracking system to empirically quantify aspects of workers' lives such as optimal lunch lines, the shape of furniture, and diet. Farhad reveals that POPs measured the lunch-line for their employees and found that 3-4 minutes is optimal in terms of workers having time to meet new people but at the same time not "waste time."[472] Google even specifies the shape and length of the so the company can put their employees in physical proximity to spur conversations and share information.[473] As "people walk down between the chairs, they bump into each other — it's actually called a 'Google bump'" according to John Sullivan, a management professor at San Francisco State University and workplace consultant.[474] This is no mere accident, but designed – and it is driven by data.[475]

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[471] Teresa Amabile and Steven Kramer, "Employee Happiness Matters More Than You Think," *Bloomberg Business News*, February 22, 2012, http://www.businessweek.com/debateroom/archives/2012/02/employee_happiness_matters_more_than_you_think.html.
[472] Farhad Manjoo, "The Happiness Machine," *Slate*, January 21, 2013, http://www.slate.com/articles/technology/technology/2013/01/google_people_operations_the_secrets_of_the_world_s_most_scientific_human.single.html.
[473] Ibid.
[474] Steven Henn, "Serendipitous Interaction' Key To Tech Firms' Workplace Design," *all tech considered*, March 13, 2013, http://www.npr.org/blogs/alltechconsidered/2013/03/13/174195695/serendipitous-interaction-key-to-tech-firms-workplace-design.
[475] Henn, "Serendipitous Interaction' Key To Tech Firms' Workplace Design."

Google's management of its employees has even gone down to the level of individual diets. Jennifer Kurkoski, who has a PhD in organizational behavior and is part of the People Analytic team, has experimented with changing workers' diets. Kurkoski explains, "When employees are healthy, they're happy. When they're happy, they're innovative."[476] Kurkoski conducted experiments to help Google employees make better food choices as she rearranged the location of food, resized plates, and replaced food containers in order to reengineer employees' eating habits. The objective behind this experiment was to understand ways to control food intake and the food choices of employees. The irony of Google's attempts to have their employees make healthy food choices is a balancing act; on the one hand, Google provides unlimited access to free food to increase productivity; on the other hand, it has found that the company needs to deal with the side effects of unlimited access to food and the concomitant risks to workers' health. This seems a benign experimentation, and even could be considered an act of true care; however, poor health will directly affect workers' capacity to perform their tasks and productivity and ultimately affects Google's bottom line.

From the minutia of diet to the entirety of the environment, Google is even designing its new campus based on data – data to bolster its workers' productivity and efficiency. The new Googleplex – set to be the largest office in the US – takes its data-driven approach to labor management to a whole new level. The company has measured everything from environmental factors like sun and wind to working and living habits of its thousands of employees. In a *Vanity Fair* interview, David Radcliffe, vice president of Google's Real Estate & Workplace Services, proudly stated that no worker would be

[476] Cliff Kuang, "In The Cafeteria, Google Gets Healthy," *Fast Company*, March 19, 2012, http://www.fastcompany.com/1822516/cafeteria-google-gets-healthy.

more than a two-and-a-half minute walk from any other co-worker in the 1.1-million-square-foot complex.[477] He explains that the new campus layout is designed to generate "casual collisions of the work force" and said, "You can't schedule innovation… We want to create opportunities for people to have ideas and be able to turn to others right there."[478] Eric Schmidt and Former Google Senior VP of Products (and current advisor to Google CEO Larry Page) Jonathan Rosenberg call it "foster[ing] serendipitous connection."[479] It seems "casual" or "serendipitous," but if I can paraphrase David Noble's book *America By Design*, it's *productivity by design*.

Laszlo Bock, Vice President of People Operations, states, "We try to bring as much analytics and data and science to what we do on the people side as our engineers do on the product side." Bock proudly declared that Google even has data on productivity based on the relationships between new employees and their managers' greeting on the first day. He states that "when an employee starts on their first day, we have data that says, if the manager shows up and says, 'Hi nice to meet you, you're on my team, we're gonna be working together,' and does a few other things, those people end up 15 percent more productive in nine months."[480] Measuring the correlation between the greeting by the managers and productivity is actually only a minor part of Google's data-driven management. Concerned about employee turnover that could have a negative effect on its ability to compete, Google even built an algorithm to identify those employees most

[477] Paul Goldberg, Exclusive Preview: Google's New Built-from-Scratch Googleplex, *Vanity Fair*, February 22, 2013, http://www.vanityfair.com/online/daily/2013/02/exclusive-preview-googleplex.
[478] Ibid.
[479] Eric Schmidt's and Jonathan Rosenberg, "How Google Works," http://www.slideshare.net/pitgottschalk/eric-schmid-how-google-works.
[480] John Blackstone*,* "Inside Google workplaces, from perks to nap pods," *CBS News,* January 22, 2013, http://www.cbsnews.com/8301-505266_162-57565097/inside-google-workplaces-from-perks-to-nap-pods/.

likely to leave based on employee reviews, promotions and pay histories.[481] Google's characteristic of labor management is epitomized by Laszlo Bock's statement: Google built an algorithm to "get inside people's heads even before they know they might leave."[482]

While Google wants to get inside its employees' heads, it also mines data to change employees' behavior, questing to identify the metrics for "good" managers. In 2009, Google launched a premier project called Project Oxygen to identify such traits. A team of researchers gathered more than 10,000 observations about managers and performance reviews, employee feedback surveys, and nominations for top manager awards.[483] The researchers then extracted general patterns in the data, built hypotheses and continued to collect more data by interviewing managers.[484] The results of this analysis are the "Eight Good Manager's Behaviors and Three Pitfalls" rules, which have been systematically implemented into Google's management training program.

This set of eight "good" behaviors is incorporated into its own workforce training program called GoogleEDU. GoogleEDU is a vehicle to socialize employees and their managers into the Google culture and its corporate values. In 2012, Google renewed GoogleEDU programs to boost employee performance. Karen May, Google's vice president of GoogleEDU, who has led the redesign of GoogleEDU, sums up the core of Google's "new" management philosophy: "what's important is that it aligns with our overall business strategy."[485]

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[481] Scott Morrison, "Google Searches for Staffing Answers," *Wall Street Journal*, May 19, 2009, http://online.wsj.com/article/SB124269038041932531.html.
[482] Ibid.
[483] Adam Bryant, "Google's Quest to Build a Better Boss," *New York Time*, March 12, 2011.
[484] Manjoo, "The Happiness Machine."
[485] Joseph Walker, "School's in Session at Google," *Wall Street Journal,* July 5, 2012, http://online.wsj.com/article/SB10001424052702303410404577466852658514144.html.

Google dances between paternalistic, participatory and data-driven scientific labor management in order to get inside of its paid workers' heads to increase productivity and maintain stability in its workforce; however, these techniques are not exclusively applied to cadres and other paid workers. They are also employed in Google's approach to its massive unwaged user labor force. The search engine firm is scientifically monitoring and managing users as well as giving them "free" services as a form of welfare program on capital's behalf. By espousing welfare programs along with scientific management, the industry wants to get inside of *all* users' heads – and Google has been doing so to unpaid labor long before it got inside its own workers' heads. This is the actual essence of Google's tenet – "focus on the user and all else will follow."

Scientific Management of User Labor

As described in an earlier chapter, since unpaid users' labor plays a vital role in Google's profitability**,** studying data about and managing user labor have become as important – if not more so – as managing paid labor. While the search engine industry does not use the term "user labor," as it does to its paid labor force, Google user activities are studied, observed and measured in variant forms of user studies as their labor is incorporated into production processes. From the early stages of their business, search engine firms have been conducting substantial research on users and tapping deeply into academic institutions as they shape and expand the field of user studies and develop expertise in this new field.

Initially, when search engine firms were using traditional information retrieval (IR) techniques, documents were the main unit of analysis and search results were based

on the keyword similarity between the query and the documents.[486] However, as the Internet provides an interactive platform where users interact between documents and the system,[487] users have become an important unit of analysis in IR systems; their activities as users provide a vital feedback loop in determining improvements of IR systems. In particular, as search business model has become based on advertising, users have become the most important unit of analysis and user feedback is directly linked to advertising revenue.

By the end of the 1990s, large-scale user studies on commercial search engines had begun to be visible within the academic industrial complex. One of the earliest user behavior studies was the Excite Research project by Jansen and Spink in 1998.[488] This research initially analyzed 51,000 queries and later expanded the data set to 2.5 million queries from Excite's transaction logs to look at searchers' online activities, including the number of queries per user, number of terms per query, number of documents viewed, query modification and distribution and occurrence of terms. In 1999, Craig Silverstein from Stanford University teamed up with Michael Moricz from AltaVista to conduct an analysis of one billion entries for search requests from AltaVista query logs.[489] This research was considered to be significant because of the longitudinal nature of the large-scale commercial search data collected to understand individual patterns of search use.[490]

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[486] Ashok Veilumuthu and Parthasarathy Ramachandran, "Discovering Implicit Feedbacks from Search Engine Log Files" in *Discovery Science*, ed. Vincent Corruble et al. (Springer Berlin Heidelberg, 2007): 197-208.
[487] Danny Sullivan, "Search 4.0: Social Search Engines & Putting Humans Back In Search," *Search Engine Land*, May 28, 2008, http://searchengineland.com/search-40-putting-humans-back-in-search-14086.
[488] Bernard Jansen and Amanda Spink, "The Excite Research Project: A Study Of Searching By Web Users," http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.26.1410.
[489] Craig Silverstein, Hannes Marais, Monika Henzinger and Michael Moricz, "Analysis of a very large web search engine query," ACM SIGIR Forum 33, no. 1 (1999); 6-12, http://dl.acm.org/citation.cfm?id=331405.
[490] Ibid.

Silverstein et al. found that users tended to type short queries and that the majority looked at the first 10 results.[491] The search engine business continues to exploit this general user behavior pattern as it sells search results.

In particular, large-scale user research is considered a necessary method to learn general and individual patterns of what, how and why users are searching as the industry engages the mass population. Search engine firms began to conduct their own research using their own data – frequently but not always in conjunction with academics.

User studies are encompassed in a range of different research areas including user experience, user engagement, human computer interaction, user data mining etc. Over the last 10 years, under these diverse rubrics, search engine firms have been deploying various research methods to understand users through log analysis, ethnographic studies click metrics, questionnaire surveys and lab and field studies on searchers' activities across the spectrum. It is notable that search engine firms began to publish some of their research output at academic and industry conferences beginning in the early 1990s. Since 1993, Google – which lists 715 researchers – has published 2,899 research articles as of July 2014; Yahoo! lists 2043 publications.[492] The research area of user studies overlaps with a range of other fields; thus, it is difficult to identify the exact numbers of publications specifically targeting user activities. However, much research related to user activities commonly falls into the areas of algorithms, machine learning, artificial intelligence, data mining, human-computer interaction (HCI), and information retrieval (IR). Microsoft has more than 2000 publications falling under the IR heading while for Google, almost 50% of its research output belongs to those areas.

[491] Silverman, Marais, Henzinger and Morciz, "Analysis of a very large web search engine query."
[492] "Research at Google," http://research.google.com/researchers.html; "Yahoo Lab," http://labs.yahoo.com/publication/.

Not accidently, these research areas have become popular within the wider field of computer science in universities. According to a dataset of 2200 faculty in the top 50 US Computer Science Graduate Programs from Brown University, the largest field of research in computer science is Algorithms & Theory which is at the nexus of machine driven user data mining and analysis.[493] As a business strategy, the search engine industry has been supporting robust programs for universities around the world, aiming for them to serve corporate interests through the establishment of funding, visiting faculty programs, post doc programs, and internships.

Before 2010, Google funded many smaller research grants,[494] but since 2010, it has begun to substantially fund research focused on Google's business, launching its *Google Focused Research* program – "areas of study that are of key interest to Google as well as the research community."[495] In the first year of the program, a large grant of $1.35M went to a University of Washington researcher, a former Intel research director, whose work is on mobile data collection in science. In 2014, Google received 691 proposals and funded 115 projects in 46 countries;[496] the company gave the most funding in the fields of human-computer interaction, systems, and machine learning which are the areas where users are most involved. Academic institutions are eager to seek Google's funding and work with the "most innovative" company in the world as they ally their

[493] This dataset was collected as a project for a Human Computer Interaction course at Brown University in Spring of 2014. Detailed data is available at http://cs.brown.edu/people/alexpap/faculty_dataset.html.
[494] Nick, Eaton, "Google grants UW researcher $1.35M for data collection," *Seattlepi*, February 4, 2010, http://blog.seattlepi.com/microsoft/2010/02/04/google-grants-uw-researcher-1-35m-for-data-collection/; Steve Lohr, "Google puts New Focus on Outside Research," *New York Times*, February 1, 2010, http://bits.blogs.nytimes.com/2010/02/01/google-extends-outside-research-funding-to-new-fields/?_php=true&_type=blogs&_r=0.
[495] "Announcing Google's Focused Research Awards," *Google Official Blog*, February 2, 2010, http://googleblog.blogspot.com/2010/02/announcing-googles-focused-research.html.
[496] "Google Research Awards: Winter 2014," *Google Research Blog*, February 18, 2014, http://googleresearch.blogspot.com/2014/02/google-research-awards-winter-2014.html.

research with corporate commercial interests. Of course, this shouldn't come as a surprise as spending cuts from public funding has led universities to seek corporate funding more intensively and policies like the US government's 2013 "lab to market" initiative to spur commercialization of Federal government's taxpayer funded academic research. By bringing universities and corporate researchers together with government support, the industry has been able to bolster the field of user studies, and bring experts under its sway.

Delving into Users

The Internet industry is pushing the scope of user research beyond merely tracking general patterns of user behavior through traditional analysis of query logs. Basically, every minute movement of users is becoming of interest to the industry. Google research is working on prediction of users' behavior based on historical performance of user search patterns,[497] tracking individual user behavior over various search services and platforms such as images, maps, voice, mobile and tablets,[498] examining the conditions that convert users into consumers, and even detecting an individual searcher's frustration in real time,[499] users' response times to speed of search services,[500] and building a user's personal interest profile based on click behavior and

[497] Yair Shimshoni, Niv Efron, and Yossi Matias, "On the Predictability of Search Trends," *Google Israel Labs*, August 17, 2009, http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en/us/archive/google_trends_predictability.pdf.
[498] Maryam Kamvar and Shumeet Baluja, "A Large Scale Study of Wireless Search Behavior: Google Mobile Search" (paper presented at CHI, Montreal, Quebec, Canada, April 22-27, 2006), http://www1.cs.columbia.edu/~mkamvar/publications/CHI_06.pdf.
[499] Anne Aula, Rehan Khan, and Zhiwei Guan, "Frowns, Sighs, and Advanced Queries -- How does search behavior change as search becomes more difficult?" *Google Research Blog*, September 17, 2010, http://googleresearch.blogspot.com/2010/09/frowns-sighs-and-advanced-queries-how.html.
[500] Jake Brutlag, "Speed Matters," *Google Research Blog*, June 23, 2009, http://googleresearch.blogspot.com/2009/06/speed-matters.html.

personalized recommendation system.[501] Along with Google, Microsoft and Yahoo! have also expanded their research in behavior biometrics and cognitive behavior. This type of research seems merely to be purely academic scientific experimentation, and far from current search engine business, but they are the basis of future profit-making projects.

Eye-tracking technology built on visual behavior data is an illustrative example. In 2005, Google researchers published an article entitled "Incorporating eye tracking into User Studies at Google" which revealed that the company collected eye-tracking data to supplement their understanding of user behavior as well as to measure users' feelings towards Google's services and products.[502] Yahoo! and Microsoft have both endeavored to keep up with Google in this area. Microsoft has published several research studies on eye-tracking of users' visual attention as they surf the Web. These studies examined gaze duration and differences in individual gaze patterns to understand user attention and the relationships between visual attention of where and why users look on the screen and decide to click.[503] This eye-tracking technology is now commonly being used by search engine industry to see how users navigate homepages, identify "hot zones."

While the search engine industry, allied with academic institutions, is able to guide the general research agenda for user studies on behalf of the industry, search engine firms are also pursuing their own secret projects to help them preempt and monopolize the market. Google has its semi-secret lab called Google X where engineers and scientists

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[501] Jiahul Liu, Elin Pedersen, and Peter Dolan, "Personalized News Recommendation Based on Click Behavior" (paper presented at the International Conference on Intelligent User Interfaces, New Orleans, Louisiana, January 9-12, 2010), http://static.googleusercontent.com/media/research.google.com/en/us/pubs/archive/35599.pdf.

[502] Laura Granka and Kerry Rodden, "Incorporating Eye tracking into User Studies at Google," in *ACM CHI 2006* workshop on Getting a Measure of Satisfaction from Eye tracking in Practice, http://static.googleusercontent.com/media/research.google.com/en/us/pubs/archive/34377.pdf.

[503] Susan Dumais, Georg Buscher, and Edward Cutrell, "Individual Differences in Gaze Patterns for Web Search," *Proceeding of the third symposium on Information interaction in context*, 2010, http://research.microsoft.com/apps/pubs/default.aspx?id=156118.

are experimenting with self-driving cars, drone technologies, robotics, and Google glass. In the lab, Google has also quietly developed eye-tracking as a hands-free way of unlocking, manipulating and navigating mobile and wearable devices,[504] and "pay-per-gaze" eye-tracking technology that could measure user engagement based on how long a user looks at an ad and their emotional response as indicated by pupil dilation so that advertisers could price based on actually seeing their ads.[505] *Wired* magazine reports that Google's pay per gaze technology is clearing a path for an advertising business model for wearables.[506] Google has already filed patents for these technologies.

User Labor as Big Data

The search engine industry's consistent investment in user research has been critical to figure out ways to understand and normalize inherently irregular, heterogeneous and complex user information activities so that they can be predicted and incorporated into search engine mechanisms, products and profit. However, the precondition of this process is the collection of user activity data; in other words, surveillance is the prerequisite for search business. Thus, from the beginning of its business, the industry has aggressively deployed and experimented with a wide range of data mining techniques to collect and control user data.

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[504] Scott Nicols, "Google patents eye-tracking for Google Glass," *Techradar*, August 7, 2012, http://www.techradar.com/us/news/portable-devices/google-patents-eye-tracking-for-google-glass-1091428.

[505] Richard Chirgwin, "Google proposes eye-tracking ad-tracking Adds more 'creepy' to Glass," *Register*, August 19, 2013, http://www.theregister.co.uk/2013/08/19/google_proposes_eyetracking_adtracking/; Adrianne Jeffries, "Google patents 'pay-per-gaze' eye-tracking that could measure emotional response to real-world ads," *Verge*, August 18, 2013, http://www.theverge.com/2013/8/18/4633558/google-patents-pay-per-gaze-eye-tracking-ads.

[506] Richard Tso, Google Pay Per Gaze' patent pave way for Wearables Ad Tech," *Wired*, September 27, 2013, http://www.wired.com/2013/09/how-googles-pay-per-gaze-patent-paves-the-way-for-wearable-ad-tech/.

There are two common methods implemented by the industry to observe and manage searchers' activities – server logs and client logs. One of the original methods used to observe the characteristics and patterns of searchers' activities is the transaction log. The transaction log (which refers to a search log) in a search engine is the record of interactions between the search engine and users' searches.[507] Search logs are considered server-side logs since Web servers record and store the interaction between searcher's browser and the search engine.[508] This server-side log basically allows the tracking of the interaction between the user, her query, and the search engine.[509] The data included in the logs are the user's IP address, time spent on a page, click path (aka "click stream"), the url of the requested item, search term used, search content, number of unique visitors, browser type, and browser language.[510] Search engine firms record a "server log" every time a user makes a query with their search engine. One of the reasons that using server logs to monitor user activities has been common is because a large set of data can be collected in a fairly easy and low-cost way. Since users are not aware of the process whereby their activities are being observed, this is a technique "to obtain a large quantity of data on unaltered user behavior in the complex Web environment."[511] The industry has been fighting to retain control of these data.

This mass quantity of routinely collected search logs could be held by search engine companies for an indefinite period up until 2007, when the European Union's advisory body of member states' telecommunications ministers, called the Article 29

[507] Bernard Jensen, "Search log analysis: What it is, what's been done, how to do it," *Library and Information Science Research* 27 (2006): 408.
[508] Ibid.
[509] Ying Zhang, Bernard Jensen, and Amanda Spink, "Time series analysis of a Web search engine transaction log, *Information Processing and Management* 25 (2009): 230-245.
[510] Bernard Jensen, "Search log analysis," 424.
[511] Amanda Spink and Bernard Jansen, *Web search: Public searching of the Web* (Dordrecht, Netherlands: Kluwer Academic Publishers, 2004), 38.

Working Party (WP29), asked that major search engines doing business in the region anonymize the personally identifiable data in search logs after 6 months to protect consumer privacy. Google's rival Microsoft, which had less than 2 percent market share in Europe at that time,[512] first agreed to comply with the European Union's demand that data retention be cut to six months while the company reminded the Working Party that a single company – which meant Google – was controlling the majority of the market and its data practice had turned into an industry standard. Shortly thereafter, Yahoo! said the company would limit its search logs to 90 days before anonymization and pressured its competitors to shorten their data retention period.[513] Yet, the importance of user data for search engines showed when the company reversed its decision in 2011 and extended its data retention back to 18 months. Yahoo!'s reason for its reversal was "to meet the needs of consumers" yet, the company admitted that shortening its data retention policy had "set them apart from the rest of the industry."[514] It suggests also that the longer duration possesses importance.

Google initially resisted the EU's demands, but compromised to make search log data anonymous after 18-24 months, and later cut it down to 9 months' retention. In the process of negotiations with the EU, Google's security/privacy engineer Alma Whitten, who was involved in Google's decision on data retention, was quoted in *Ars Technica* describing Google's data retention;

> Wonderful things can be done with an abundance of data… When Google's teams began looking at the data retention issue a few years back, they "started with

[512] "Search engine market share by country," http://www.them.pro/Search-engine-market-share-country
[513] Miguel Helft, "Yahoo Limits Retention of Search Data," *New York Times*, December 17, 2008, http://www.nytimes.com/2008/12/18/technology/internet/18yahoo.html.
[514] "Updating our Log File Data Retention Policy to Put Data to Work for Consumers," *Yahoo Policy Blog,* April 15, 2011, http://www.ypolicyblog.com/policyblog/2011/04/15/updating-our-log-file-data-retention-policy-to-put-data-to-work-for-consumers/.

> zero" and tried to see if they could make it work. They could not; Google would lose the ability to do too many useful things.[515]

In other words, without harnessing search logs – records of users' labor – Google would limit the profit delivered from its products. However, Google and other Internet firms persistently present the reason for data collection and retention as one of "care" for its users. Like Yahoo!, Google's first privacy principle is "use information to provide our users with valuable products and services."

While collecting and analyzing search logs are popular techniques and indispensable for profit-making, Internet firms have found that the server side search logs are limited in terms of harvesting user activities in their entirety – because server logs only capture the clicked link or the information submitted through the browser.[516] However, the industry is interested in learning user activities *before* the actual click to understand users' search intentions through users' mouse hovering and scrolling etc. Bernard Jansen, Amanda Spink, and Tefko Saracevic noted that search log data reflects real artifactual search behavior, but do not provide the context of search activities.[517]

To overcome the limitations of server-side logging, the industry has also been deploying client-side techniques – referring to a user's computer or an application that makes requests to servers – to capture more comprehensive individual activities, including information such as what a user *might* consider but does not actually click,

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[515] Nate Anderson, "Why Google keeps your data forever, tracks you with ads," *Ars Technica,* March 8, 2010, http://arstechnica.com/tech-policy/2010/03/google-keeps-your-data-to-learn-from-good-guys-fight-off-bad-guys/.
[516] Xin Fu, "Evaluating sources of implicit feedback for Web search" (PhD diss., University of North Carolina at Chapel Hill, 2007), 61.
[517] Bernard Jansen, Amanda Spink and Tefko Saracevic, "Real life, real users and real needs: A study and analysis of users' queries on the Web," *Information Processing and Management* 36, no. 2 (2000): 207-227.

printing, bookmarking, use of the back button, etc.[518] Client-side logs are collected by installing Web applications on a user's computer.[519] The browser is one of the most common Web applications that are utilized by search engine firms to collect individual searchers' activities. Compared to search logs, client-side logs reveal literally every move a user makes – including keystrokes, mouse clicks, submission of the form, backtracking, user login and profile information, and page requests – and have the most robust types of logging information. Lara Catledge and James Pitkow examined client-side user interactions on NCSA's XMosaic and pointed out that "actual user behavior, as determined from client-side log file analysis … can supplement the understanding of Web users with more concrete data."[520] Given this, there is a reason that search engine firms have introduced their own browsers and designed numerous other client side apps to work with their specific browsers because they are not only a way to increase Web traffic but also can be used as platforms to collect enormous amounts of information on user activities.

This log data from both the server and client sides provides a large breadth and quantity of information surrounding user activities on the Web. However, the problem of these data for Internet businesses was initially in the difficulty in tracking an individual user's activity, because the HTTP protocol in which a search engine and a browser communicate is a "stateless" protocol. This means that each query is a new connection and appears independent of any requests the user (browser) made previously, while most

[518] Fu, "Evaluating sources of implicit feedback for Web search," 61.
[519] Diane Kelly, "Methods for Evaluating Interactive information retrieval systems with users," *Foundations and Trends in Information Retrieval* 3, no. 1-2 (2009): 90, http://ils.unc.edu/~dianek/FnTIR-Press-Kelly.pdf.
[520] Lara Catledge and James Pitkow, "Characterizing browsing strategies in the World-Wide Web," *Computer Networks and ISDN Systems* 27, no. 4 (1995):1065.

Web applications require multiple requests to finish a particular task. The HTTP protocol was initially designed to support stateless applications. This preserves some degree of privacy for users; yet, the stateless protocol was problematic for Internet firms for their online business, because applications have to maintain "state" information in order to remember login permission, transaction stages, items added to a shopping cart etc., but HTTP protocol does not support those necessary business functions.

This is where "cookies" come in. Cookies were introduced by Netscape in 1994. They are small text files that reside on the searchers' hard drive and pass between the Web browser and Web server. Cookies help to maintain "state" and contain a unique identifier, which allows a Website to recognize and distinguish the user whenever s/he visits a site. Thus, they are used to identify a specific session ID when a Web browser interacts with a Web application. Moreover, cookies contain state related data such as a user ID, passwords, purchase history, and consumer preferences, which can be extrapolated to a single visitor. These data are the vital assets for the Internet marketplace. Cookies are a more accurate method for identifying individual users than simply depending on IP address. The IP address of the client machine also represents an individual user, but it is difficult to associate the IP address with the particular user since more than one person could use one computer and/or ISPs often assign dynamic IP addresses.[521] Since identifying and reaching out to each individual user rather than merely targeting demographics is critical to the Internet industry, cookies have become an essential and necessary tool for the user analysis process, and expansion of online advertising. Thus, search engine firms are fighting tooth and nail to control cookie data.

[521] Spink and Jansen, *Web search: public searching on the Web*, 38-39.

In 2007, Google's cookie data were set to expire in 2038. Google was the first search engine firm to specify a data retention policy of 30 years and this became the norm among Internet firms. Google's draconian data control was heavily criticized by privacy advocates, and when the EU asked US internet firms to reduce their data retention periods in 2007, as mentioned earlier, Google changed their retention of cookies information to 18 months while keeping its server logs for 9 months before anonymizing part of its IP data. This means that Google truncates/ anonymizes the last octet of the IP address to prevent itself from being able to trace any particular query back to a particular computer. This doesn't completely anonymize the data, it just makes it more difficult to computationally zero in on specific users' activity.

Since their inception, cookies have been at the center of privacy debates. When Netscape implemented cookies in 1994, cookies were accepted by default, and users were unaware of their existence. However, there was soon a growing concern over cookies in terms of privacy. In 1995, the Internet Engineering Taskforce (IETF), an Internet standards body, led the development of cookie specifications; at that time it was not clear that Netscape's cookie specification would become the basis for the IETF's standard.[522] Initially, IETF proposed prohibiting a browser from accepting third party cookies or permitting a browser to accept them by default provided the user could control the option and the default was to opt out.[523] There was also a proposal to limit state information with cookies being destroyed at the end of each browser session. Online advertisers vehemently objected to this proposed standard because they had already recognized that

[522] David Kristol, "HTTP Cookies: Standards, privacy, and politics," *Journal of ACM Transaction on Internet Technology* 1, no.2 (2001); 151-198, http://dl.acm.org/citation.cfm?id=502153.
[523] Ibid., 160.

limiting cookie usage was a threat to their business model. In the end, Netscape's cookie specifications were used as a baseline, which favored corporate- over users' interests.

Interestingly, Netscape's default cookie specification being altered not by public demands but by the information industry itself has had far-reaching implications. Internet firms began to block third party cookies to prevent the collection of their data by rival firms. Apple's Safari browser has been configured since 2003 to block third party cookies by default, Microsoft's Internet Explorer (IE) and Opera browsers enabled "Do Not Track" as a default and Mozilla's Firefox browser has blocked third party cookies since Firefox version 26 in late 2013. Google's Chrome browser is the only one to allow all cookies as the default setting. The significance of the industry's move could be merely seen as a victory for users and privacy advocates, but underneath this shift there are inter capitalist rivalries trying to set the terms on behalf of their own interests. In particular, Microsoft's change of cookies settings directly attacks Google's ads business, given IE's large market share of over 58%.[524] Blocking third party cookies in IE prevents Google from using behavioral ads targeting based on users' previous browsing activity in its AdWords. On the other hand, Microsoft is positioning IE 10 as a "pro-consumer" product and an alternative to Google's Chrome browser. In the case of Apple's Safari browser, it has only 5% of market share on the desktop, but it is the most widely used browser on mobile devices and designed to block third party cookies. This is a major problem for Google whose business is advertising. So what's Google's solution? Google along with other advertising companies, were willing to break into Apple's Safari security settings to collect user data. Google used a code in its advertisements to trick Safari browser into

[524] Anthony Leather, "Google Chrome Browser Market Share Tops 20%: Leaves Firefox In Its Dust," *Forbe*, August 4, 2014, http://www.forbes.com/sites/antonyleather/2014/08/04/google-chrome-browser-market-share-tops-20-leaves-firefox-in-its-dust/.

collecting user data on both desktop computers and iPhones. For hacking Safari browser and tracking users' history, Google was fined $22.5 million by the Federal Trade Commission (FTC).[525] The fact that Google was willing to take this risk knowing full well the legal consequences shows the critical nature of the data. Google and its 800-strong legal team clearly understands that its voracious data collection activities are potentially illegal, yet the company is intentionally – and sometimes covertly – pushing the boundaries of data collection and privacy laws to shape the legal environment in favor of its business.

Cookies are still the most widely used technique for data collection of users' online activities, but this is also changing. According to a study by the UC Berkeley Center for Law and Technology, nearly 85 percent of the top 1,000 sites have cookies set by a third party.[526] However, Internet firms have been looking for alternative technologies for cookies because third-party cookies are inconsistent and limited in reach because they are now blocked by default on major browsers, some users remove cookies on a regular basis, and cookies do not translate well to the mobile environment because they don't provide cross device user tracking capabilities.[527]

In the rapidly growing mobile space, Internet firms have already begun to use new forms of tracking technologies. Google introduced its Advertising ID (AID), which allows advertisers to track user behavior across all Android apps using the AID to target

[525] "Google Will Pay $22.5 Million to Settle FTC Charges it Misrepresented Privacy Assurances to Users of Apple's Safari Internet Browser," *Federal Trade Commission*, August 9, 2012, http://www.ftc.gov/news-events/press-releases/2012/08/google-will-pay-225-million-settle-ftc-charges-it-misrepresented.
[526] Nima Wedlake, "As advertisers phase out cookies, what's the alternative?" *Gigaom*, March 29, 2014, http://gigaom.com/2014/03/29/as-advertisers-phase-out-cookies-whats-the-alternative/.
[527] Ibid.

ads to specific users at specific times.[528] Google's AID is similar to Apple's Identifier For Advertisers (IDFA) introduced in 2012 (and now required for all iOS apps). Google has not yet abandoned cookies on mobile devices; however, as the Internet business is shifting to the mobile sphere, the industry is in search of better user tracking techniques.

One of the most controversial data collection methods employed by Google was the packet sniffer, a piece of software (sometimes a hardware device) which was able to monitor the network traffic coming in to a Web server and to extract usage data directly from TCP/IP data packets. The use of a packet sniffer is not illegal per se because it was originally designed to assist network administrators in troubleshooting their network. Yet, between 2007 and 2010, Google used it to capture vast quantities of private Web traffic data from open Wi-Fi routers.[529] In fact, Google was building a database of Wi-Fi location information to correlate cell towers and Wi-Fi routers with coordinates to use in its mobile business. Google admitted that it sniffed open wireless networks "to map those networks, which would then be used by mobile devices such as smartphones to pinpoint their locations in Google's mapping services."[530] According to court documents, Google used its new patent-pending Wi-Fi sniffing technology to collect data.[531] The patent application illustrates that Google is interested in more than just basic Wi-Fi location information. Rather, the company states that, "collection, decoding, and analysis of a user's payload data would, therefore, serve to increase the accuracy, value, usability, and

[528] "Google's New Advertising ID: Is it Good News for Mobile App Developers?" *airpush*, May 5, 2014, http://www.airpush.com/googles-new-advertising-id-is-it-good-news-for-mobile-app-developers/.
[529] Gareth Halfacree, "Google admits Street View WiFi sniffing," *bit-tech,* May 17, 2010, http://www.bit-tech.net/news/bits/2010/05/17/google-admits-street-view-wifi-sniffing/1.
[530] Gregg Keizer, "Google wants to patent technology used to 'snoop' Wi-Fi networks," *Compute World*, June 3, 2010, http://www.computerworld.com/s/article/9177634/Google_wants_to_patent_technology_used_to_snoop_Wi_Fi_networks.
[531] Keizer, "Google wants to patent technology used to 'snoop' Wi-Fi networks."

marketability of Google's new method."[532] Though Google claims that collection of payload data – including all traffic on unsecured Wi-Fi networks like email, text message, passwords, and other personal information submitted by Web forms, browsing histories etc. – was inadvertent, the Federal Communications Commission (FCC) Report shows that Google wanted more than mere Wi-Fi network location data.[533] The FCC concluded that Google did not violate any law; FCC closed the case with a mere $25,000 fine for failing to cooperate in the FCC's investigation.[534] Along with the FCC, the Federal Trade Commission (FTC) ended its investigation without a fine and concluded that Google had given the FTC assurances that the company would not use data that they collected. These verdicts are indicative of the US government allying itself with Google and legitimatizing these kinds of data collection practices. Google even took this case to the US Supreme Court in an attempt to legalize collecting private data through open Wi-Fi networks after a federal appeals court ruled that the practice violated user privacy.[535] The Supreme Court declined to hear Google's case.

After much publicity, Google declared that the company had stopped the data collection program by its Street View Cars. Yet, this did not mean that Google has given up mapping Wi-Fi hotspots, given that all of Google's mobile products hinge on a database of locations vital for mobile services – including mobile applications to function and to serve highly tailored ads based on users' specific locations. A Google product

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[532] Ibid.
[533] David Kravets, "An Intentional Mistake: The Anatomy of Google's Wi-Fi Sniffing Debacle," *Wired,* May 2, 2012, http://www.wired.com/2012/05/google-wifi-fcc-investigation/; "Enforcement Bureau issues $25,000 NAL to Google Inc," *Federal Communication Commission,* https://apps.fcc.gov/edocs_public/attachmatch/DA-12-592A1.pdf.
[534] In 2013, Google reached a $7 million settlement with 30 states' attorneys general over its Street View data collection practices, and the company still faces street view investigations abroad.
[535] Lauren Williams, "Google Wants The Supreme Court To Legalize Collecting Private Data Through Open Wi-Fi Networks," *Think Progress*, April 3, 2014, http://thinkprogress.org/justice/2014/04/03/3422086/google-wiretapping/.

manager revealed in the *Wall Street Journal* that "the collection of location information from millions of mobile devices and personal computers is 'extremely valuable' to the company's future business."[536]

Now Google is leveraging users with mobile devices to collect its data as Android phones regularly check on users' location using GPS, Cell ID and Wi-Fi to locate the device and send back data to Google's location servers. The location service identifies a phone's location by comparing the names and strengths of nearby Wi-Fi hotspots against its database of Wi-Fi hotspots.[537] With this method, users do not even need to turn on Google Maps or actually be connected to a Wi-Fi hotspot because their phone will detect Wi-Fi- and users' location regardless.[538]

This technique was originally developed by Skyhook Wireless, which competes with Google's location service. Apple chose Skyhook over Google when Apple's first generation iPhone did not have a location database, while leaving data collection to Skyhook and Google. As mentioned in an earlier chapter, Google was irked by Apple's use of Skyhook over Google's service, and when Samsung and Motorola chose to use Skyhook's service, the company forced them to drop the contract under the clause of incompatibility with Android OS and to replace it with Google's own system. In fact, Skyhook filed a lawsuit against Google for business interference and patent infringement. The suit documents revealed that Google's main reason for fervently trying to handle location services for mobile phones was because Google "could collect the users' Wi-Fi

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[536] Amir Efrati, "Google Calls Location Data 'Valuable,'" *Washington Post*, May 1, 2011, http://online.wsj.com/news/articles/SB10001424052748703703304576297450030517830.
[537] Nick Bilton, "Tracking File Found in iPhones," *New York Times*, April 20, 2011, http://www.nytimes.com/2011/04/21/business/21data.html.
[538] Steven Vaughan-Nichols, "How Google--and everyone else--gets Wi-Fi location data," *ZDNet*, November 16, 2011, http://www.zdnet.com/blog/networking/how-google-and-everyone-else-gets-wi-fi-location-data/1664.

information."[539] In a *New York Times* article, Michael Shean, the co-founder and senior vice president of business development at Skyhook said user location could be more accurately pinpointed through Wi-Fi hotspots than via GPS because GPS accuracy is limited in urban environments and inside buildings so Internet firms would use Wi-Fi and GPS in tandem. He also pointed out that they use data from users' phones to constantly update their database of Wi-Fi hotspots.[540] Why then is Google even using coercion to collect data through mobile phones? Google is racing after location-based services (LBS) market set to be worth $39.87 billion by 2019. Since Google had to drop collecting Wi-Fi data through its maps car, collecting location information through Android has become more essential than ever.

Apple and Microsoft are using the same technique to collect location data. Since 2010, Apple also began to provide its location-based service through its own database of Wi-Fi hotspots. The company was even recording users' geo-location data in an unprotected file on iPhones. This led to a Congressional investigation in 2011, and Apple's response to Congress was "by using any location-based service on your iPhone, you agree and consent to Apple's and its partners and licensees' transmission, collection, maintenance, processing and use of the location data to provide such products and services."[541] Yet, it turned out that even if location services were turned off, Apple was

[539] Neil Huges, "Skyhook accuses Google of disparaging its technology to Apple," *apple insider*, July 3, 2013, http://appleinsider.com/articles/13/07/03/skyhook-accuses-google-of-disparaging-its-technology-to-apple.
[540] Miguel Helft, "Google Says It Collects Location Data on Phones for Location Services," *New York Times*, April 22, 2011, http://bits.blogs.nytimes.com/2011/04/22/google-says-it-collects-location-data-on-phones-for-location-services/?_php=true&_type=blogs&_r=0.
[541] Letter to US Representatives Edward J. Markey and Joe Barton from Bruce Sewell, General Counsel and Senior Vice President of Legal and Government Affairs, Apple Inc., http://www.wired.com/images_blogs/gadgetlab/2011/04/applemarkeybarton7-12-10.pdf.

still collecting and storing the data.[542] In order to please European regulators, Google offered users an opt-out option from Google's location service.[543]

Besides these controversial data collection methods, there are lesser-known but long-standing techniques that are also employed. For example, a Web beacon, often referred to as a Web bug, is another technique to collect user activity data. The Web beacon – sometimes used in tandem with or to deliver a cookie – is a transparent 1 pixel by 1 pixel graphic that is embedded in a Web page or email. When implemented using JavaScript instead of a graphic, they may be called JavaScript tags. Web beacons help advertisers track users. Described in an earlier chapter, Google's Analytics service and advertising networks such as DoubleClick use Web beacons to count how many have access to particular Websites and to provide a survey of targeted market information. Mining these data, they create user profiles indicating the types of ads to be shown to particular users. Web beacons are also embedded in email like Gmail, Hotmail, etc. to track details about when a message is read and to whom the message might be sent.

This is not even close to a comprehensive list of user tracking and data control strategies, but illustrated above are the major techniques and efforts that are employed by the search engine industry to collect and manage user activity data. Backed by the use of enormous technical capacity, labor and capital, the amount of user data collected, managed and analyzed by search engine firms is astronomical. Bing is currently storing nearly 300 petabytes of data and creating nearly 1 terabyte of data each day.[544] Google

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[542] Jennifer Valentino-DeVries, "IPhone Stored Location in Test Even if Disabled," *Wall Street Journal*, April 25, 2011, http://online.wsj.com/news/articles/SB10001424052748704123204576283580249161342.

[543] Don Reisinger, Google to let users opt out of location data collection," *CNET,* September 14, 2011, http://www.cnet.com/news/google-to-let-users-opt-out-of-location-data-collection/.

[544] Brad Sams, "Bing is comprised of ~300 petabytes of data," *Newowin,* June 11, 2012, http://www.neowin.net/news/bing-is-comprised-of-300-petabytes-of-data.

processes 25 petabytes (a petabyte is about 1,000 terabytes) each day. The search engine industry is *the* major data collection machine in the data business – the epitome of so called "Big Data." This big data, collected primarily through the labor of unpaid users, is the basis of the search business.

The "big data" of search has been growing exponentially, predicated upon effective techniques of labor control. As Jacoby has pointed out, welfare capitalism has endured after the Great Depression. There is a resurgence of welfare capitalism – a mark of the industrial economy; however, while earlier welfare capitalism was designed to control the working class in order to quell the power of labor unions, today's welfare capitalism is being deployed to manage the elite class in non-union tech firms. Backed by data, "science" and the interactive nature of Internet technologies, the current welfare capitalism is redressed with a façade of democracy but conceals the exploitative relationship between capital and labor as if capitalism could be built on democratic and participatory ideals. While Taylorism has been criticized for its dehumanization of workers, a new stage in the historical arc of Taylorism is reemerging that is celebrated today and has been adopted by Google and other Internet firms. And this time, it's being applied not only to low level factory workers but to elite cadres and the unwaged labor as well. This lucrative search business built on the backs of massive amounts of unpaid labor is transnationalizing as it searches for new markets and new labor by expanding its geographical territories. The following chapter scrutinizes the different economic zones of China and the EU, where US digital capital is facing the most resistance.

Chapter 5

Market Dynamics and Geopolitics: A Search for Stability

The search engine industry operates across territorial boundaries as the gateway to the newly established marketplace of the Internet, and has become a key part of the world's information infrastructure. Search is being organized as a social, political and economic control structure, and plays an instrumental role in deepening information markets on a transnational scale. This fundamental function of search is dominated not by Japan, Germany or France or China, but by the US-based search engine industry – mainly Google. US dominance in search seems to reaffirm the existing global political economic power structure, however, it has opened up a new geopolitical flash point as it recounts the unequal structure of information control. As Schiller posits, the construction of extraterritorial networks is a complex and contradictory process, one which not merely depends on technical experts but involves interests of states, various corporate users, and political constituencies.[545]

By situating search within current geopolitical contexts, this chapter elucidates tensions and conflicts to control over the new strategic information domain, a vital sector in organizing global transnational political economy. In particular, it focuses on the most globally contested zones where US-based transnational capital is facing opposition – the People's Republic of China (PRC), a relatively new and expansionary force within the global economy and the world's second biggest economy, and the European Union (EU) – US's longtime ally as well as its global competitor and political counterweight.

[545] Dan Schiller, Geopolitical-economic conflict and network infrastructures, *Chinese Journal of Communication* 1, no.1 (2011), 90-107.

Examining the geopolitical aspects of search, this chapter situates the dynamics of the political economy of contemporary transnational capitalism.

Unfinished Battle

Historians have documented that information and communication networks have long been of strategic importance to the global political and economic interests of the great powers.[546] In the 19th century, European powers – Britain, Germany, France, Russia – and their capital extended their political influence and commercial interests by building global information networks. Great Britain exerted its political, economic and military power, led manufacturing, commerce, finance and industrial technologies as it monopolized global information. Between 1864 and 1880, British firms laid submarine cables to Gibraltar, Malta, Egypt, India, Hong Kong and Australia as the amount of global submarine cable increased eighty six times.[547] By 1887, Britain controlled 70 percent of the world's cables; and twenty-five years later, it still retained a 63 percent share and dominated global information flow and networks.[548] The majority of countries, including the United States, depended on British-controlled information networks for military and strategic purposes and finance and commodity markets.[549] This put its rivals Germany, France, and Russia in vulnerable positions, which manifested during World War I (WWI). When Great Britain declared war against German imperial ambition, it first destroyed two German submarine cables that connected Europe and America, and began to censor all communication that went through British-controlled cables in order to

[546] H. Schiller, *Information and the Crisis* Economy; Daniel Headrick, *The Invisible Weapon: Telecommunications and International Politics, 1851-1945* (New York: Oxford University Press, 1991): Jill Hills, *Telecommunications and Empire.* Urbana: University of Illinois Press, 2007; Smith, *The Geopolitics of Information*.
[547] Aashish Velkar, *Markets and Measurements In Nineteenth-Century* Britain (Cambridge: Cambridge University Press, 2012), 64.
[548] Headrick, *The Invisible Weapon,* 28.
[549] Ibid.

isolate Germany.[550] This affected the US political economy due to the lack of sufficient independent network infrastructure. Britain's control of information infrastructure indeed hindered the growth of US economic power. This WWI experience spurred the US state and US capital to build independent information networks in order to fuel its own political and economic influence and geographical expansion. Unscathed from WWI, the US elevated its position into a rivalry with the other world powers, as Germany was defeated and Great Britain and France were weakened by the war.[551]

After WWI, the US attempted several times to build its own network, but this did not occur until World War II (WWII) and after. But over the course of WWII, the US had risen as it gained economic and military power, moved away from relying on Britain's colonial information system control, and began to build its own information infrastructure.[552] The expansion and dominance of the information industry played a central role in the US ascent. US information power has not gone unrecognized by its global rivalries, and its formidable position in the information sphere has been repeatedly assailed over the course of time as geopolitics and economics have changed.

In the 1970s, the French government was alarmed by US corporate dominance in computer and information technologies. The response to US dominance in the information sphere was articulated in the 1978 report, *Computerization of Society* – aka the *Nora and Minc Report*.[553] The report, commissioned by the French government, warned of American domination in "telematics" as a threat to French sovereignty and economic competitiveness and warned of IBM's dominance in the European information

[550] Ibid.
[551] Schiller, "Geopolitical-economic conflict and network infrastructures," 93.
[552] Ibid.
[553] Simon Nora and Alain Minc. *The Computerization of Society: A Report to the President of France* (Cambridge, Mass.: MIT Press, 1980).

market. The report urgently called on France to counter IBM, develop its own information-based industry as well as a comprehensive national strategic policy and investment in national information technology systems.

From a different direction in the 1970s, the Non-Aligned Movement (NAM), mobilized by Third World countries aspiring to self-determination, challenged the US and the western dominated information sphere as they recognized the importance of control over information for their economies, cultural independence and national sovereignty and demanded a New International Information Order (NIIO). Led by NAM, NIIO called out the imbalance of global information flows and sought out a more equitable, balanced information exchange among sovereign nations. The US, which had deployed the Free Flow of Information doctrine to support its global expansion, was criticized and questioned.[554] This conflict over NIIO led the US to leave UNESCO, which had made room for NIIO. More recently, the US has reasserted the doctrine at the forefront of its foreign and economic policy on the global stage to control over the Internet. The battles over the information sphere have never ended, but the actors and their motives have altered as have the technologies in contention with the emergence of the Internet and its related industries within a changing geopolitical and economic base.

The business of search is one of the new information domains where this global battle over the information sphere has arisen. The search engine industry operates across territorial boundaries as the gateway to the newly established marketplace of the Internet and has become a key part of the world's information infrastructure. It is also a

[554] Herbert Schiller, *Communication and Cultural Domination*. (White Plains, N.Y.: International Arts and Sciences Press, 1976); Sean MacBride. *Many Voices, One World: Communication and Society Today and Tomorrow* (Paris: UNESCO, 1980).

component of the most dynamic and prized pole of economic growth: The Internet industry.

The US recognizes the importance of this in the maintenance and extension of US-led global capitalism. President Obama, addressing American innovation in his 2011 *State of the Union* address, claimed that:

> What America does better than anyone else is spark the creativity and imagination of our people. We're the nation that put cars in driveways and computers in offices. The nation of Edison and the Wright brothers; of Google and Facebook.[555]

The search engine industry is one of the top new US strategic information industries and has opened up an entirely new global market. Led by Google, US search engine firms dominate in the sphere of information search, as they expand the domestic US information market, churn out many new products and aggressively build an extraterritorial information network. This requires them to remove barriers between nation states. However, Google's global dominance is not a permanent condition; rather, its continued growth and expansion actually depends heavily on volatile and politically organized international markets.

Contested Zones

There are a few places in the world where US capital is struggling for a foothold. China, Russia and South Korea are those rarest of places where there is a viable alternative to Google, and domestic capital has so far been able to capture and maintain those search markets. In particular, one of the most contested markets has been China – the world's largest economic growth zone and Internet market by population – where Google and other US-based Internet firms have made little headway. In China, according

[555] The White House Office of the Press Secretary, "2011 Remarks by the President in State of Union Address," January 25, 2011, http://www.whitehouse.gov/the-press-office/2011/01/25/remarks-president-state-union-address.

to the survey by *China Internet Network Information Center*, 632 million people are logged on and spend an average of 25.9 hours a week online.[556] As of 2013, the country had only 42% Internet penetration rate and still has much fertile ground where digital capital can dig. By comparison, the US has about 247 million Internet users and has 85% Internet penetration.[557]

In the world's largest Internet market, the Chinese search engine Baidu – not Google – has organized and is mobilizing the labor of millions of unpaid voluntary users. As of 2013, the company had 21,800 paid workers, handling 5 billion daily search queries from unpaid voluntary users – more than any other search engine in any other single national market.[558] To put this in perspective, the search giant Google processes 3.3 billion queries on a daily basis.[559] While Baidu only has half the paid employees that Google does, it has an immense reservoir of unpaid labor power. Baidu holds almost 80 percent of China's search-engine market by revenue and combined, China's top three search engines Baidu, Qihoo, and Sohu command almost 90% of the market.[560] Globally, Baidu is a distant second behind Google with 18.03% global market share – but this exceeds the combined market share of Bing and Yahoo!.[561]

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[556] Dexter Roberts, "Chinese Social Media Lose 7 Percent of Visitors During Crackdown," *Bloomberg Business Week*, July 22, 2014, http://www.businessweek.com/articles/2014-07-22/chinas-social-media-lose-7-percent-of-visitors-during-crackdown.
[557] "Pew Research Internet Project's Health Fact Sheet," Pew Research Center's Internet and American Life Project, http://www.pewinternet.org/Commentary/2011/November/Pew-Internet-Health.aspx.
[558] Kevin Chen, "5 Billion Reasons to Buy Baidu," *Daily Finance,* March 3, 2013, http://www.dailyfinance.com/2013/03/02/5-billion-reasons-to-buy-baidu/.
[559] Ibid.
[560] Paul Mozur and Nathalie Tadena, "Baidu's profit Rises, but Concerns Remain." *Wall Street Journal,* February 4, 2013, http://online.wsj.com/article/SB10001424127887324445904578284923371824716.html.
[561] Konrad Krawczyk, "Google is easily the most popular search engine, but have you heard who's in second?" *Digital Trends,* July 3, 2014, http://www.digitaltrends.com/web/google-baidu-are-the-worlds-most-popular-search-engines/.

The rise of the Chinese search engine industry has been commonly presented in the mainstream media in terms of the Chinese state's favoritism toward Chinese companies and/or the result of Google's partial withdrawal from China in 2010, and an attempt by new "emerging" global power China to challenge the current hegemon – the US. Yet, given China's deep reintegration into global capitalist markets, this perceived view of Google representing the US, the bearer of liberal democracy vs. Baidu representing the authoritative regime China, is incomplete and misleading and needs to be explicated in order to understand how the global search engine industry might actually have evolved. Haughty and self-serving declarations of moral principles set aside, US search companies need to participate in China's high growth Internet market. And, unlike most other regions of the world, and even allowing for very extensive financial involvement by US and other foreign Internet firms, US search companies face real and intensifying competition from units of Internet capital based in China.

Meanwhile, on the other side of the world, the search engine industry landscape is quite different. In major European countries such as France, Britain, and Germany, Google is *the* search engine. Unlike in China, there are no competitors in Western Europe – once the center of global information power – who are able to challenge Google's expansion. Given this absence of rivals, Google should be able to extend its economic activities without obstacles. Yet, the reality shows otherwise. Google is facing severe opposition, is on the receiving end of numerous antitrust lawsuits from a number of European countries and is dealing with a series of ongoing legal problems across Europe, from anti-monopoly to copyright to privacy. Google has been dealing with a major antitrust investigation in the 27-member state bloc of the European Union. As of 2013,

six European countries, including France, Britain, Netherlands, Germany, Spain and Italy had agreed on joint legal action against Google over its privacy policy. And Google's legal problems in Europe are far from over. With that in mind, what is the nature and root of opposition against Google in Europe? Who are the actors behind these conflicts?

New Challenge: China

The information industry has long been considered of strategic importance for China within the wider context of its reintegration into the global capitalist economy.[562] In the 1970s, the post-Mao Chinese Community party – just coming out of its Cultural Revolution – launched a national campaign on four areas of "modernization" – including agriculture, industry, national defense, and science and technology. According to Yuezhi Zhao, this nationalist development agenda by Chinese political elites was a way to reclaim China from historical defeat and "catch up with the West" – including in information technologies.[563] Thus, in the process of shifting from a socialist economy to a more state-capital oriented economy, Chinese policy has prioritized its information technology sectors and reorganized them as a new zone of economic growth. The former Chinese President Jiang Zemin once stated, "None of the four modernizations would be possible without information."[564] The information industry has been treated by the Chinese State as a pillar industry,[565] and it is important to consider China's ICT development to set the stage for the geopolitics of search in that region.

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[562] Yuezhi Zhao, *Communication In China: Political Economy, Power, and Conflict.* Lanham, Md.: Rowman & Littlefield, 2008; Yu Hong, *Labor, Class Formation, and China's Informationized Policy of Economic Development* (Lanham, Md.: Lexington Books, 2011).
[563]Yuezhi Zhao, "After mobile phones, what? Re-embedding the social in China's Digital Revolution," *International Journal of Communication* 1 (2007): 97.
[564] "Promotion of Information Infrastructure Urged," *People's Daily,* July 27, 2002, http://china.org.cn/english/government/37832.htm.
[565] Hong, *Labor, Class Formation*, 31.

By the 1980s, China had implemented extensive industrial policies to develop domestic information sectors, including the building of special economic zones and state-funded technology parks, supporting homegrown software and hardware IT firms, investing in state-led nationwide large-scale IT infrastructure projects, and offering tax breaks for Chinese Internet startups.[566] At the same time, China has built out its information infrastructure and made a concerted effort to promote the commercial use of information technologies at every level of industry, government and people's everyday lives. As part of the reorganization of its information sectors, the Chinese state has attracted substantial foreign capital as a vital economic strategy in shifting its economy move toward information-driven development. China's accession into the World Trade Organization (WTO) in 2000 was seen as an official juncture of China's opening up to foreign capital. However, as Yu Hong shows, long before that, the Chinese government had facilitated foreign investment in development of Internet sectors via joint ventures, contractual arrangements, equity investments, and foreign R&D investments.[567] By the early 2000s, IBM, Microsoft, Intel, Alcatel, GE, Bell Labs, and GM had all already established R&D centers in China. The development of Internet networks and its commercialization were political and economic arrangements at the center of the Chinese Party State's industrial policy, which made it possible for transnational capital to reach China's growing and lucrative information sectors. In particular was China's industrial policy regarding Internet services running over telecommunication networks.

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[566] Xiudian Dai, "ICTs in China's development strategy," in *China and the Internet: Politics of the Digital Leap Forward,* ed. Christopher Hughes et al. (London: RoutledgeCurzon, 2003), 8-29.
[567] Yu Hong (2008), "Distinctive Characteristics of China's Path of ICT Development—A Critical Analysis of Chinese Developmental Strategies in Light of the Eastern Asian Model," *International Journal of Communication* 2 (2008): 456-471.

In 2000, the Chinese government standardized the regulatory framework for its Telecom Sector as it prepared for accession into the WTO. It clearly defined the categorization between basic telecom service operators and value-added information services operating over the network such as email, Internet services, online data processing etc.[568] The PRC purposefully relaxed the restriction on foreign investment in value-added services – allowing foreign investors to own up to 50% – and the process of obtaining service licenses as compared to basic telecommunication businesses.[569] The policy explicitly encouraged Chinese private capital as well as foreign capital participation in the development of Internet service sectors. By intentionally relaxing state involvement, the Chinese party state planned to cultivate market opportunities for domestic companies by using foreign capital and speeding up the commercialization of the Internet and its related industries.

With this effort by the Chinese State to accelerate market logic, foreign capital flooded into the Internet market in China. While direct foreign investment and whole foreign ownership of Internet services was prohibited in the Internet industry, many domestic and foreign firms pursued joint ventures, joint research and development, and complex contractual arrangements of mutually beneficial interest to allow foreign firms access to the Chinese market and give Chinese firms access to foreign capital. In the case of US internet firms like Yahoo!, Ebay, Amazon, Microsoft MSN, they all entered into the Chinese market through joint ventures with a local company. In addition to joint ventures, another common route that Chinese Internet firms used is a system called

[568] Richard, Hanley, *Moving people, goods, and information in the 21st century: the cutting-edge infrastructures of networked cities* (London: Routledg, 2004), 166.
[569] Scott Yunxiang Guan, *China's Telecommunications Reforms: From Monopoly Towards Competition* (Hauppauge, N.Y.: Nova Science Publishers, 2003), 78.

Variable Interest Entities (VIEs), a workaround in which foreign investment can be utilized to participate in restricted industries such as the Internet and telecommunication, but may not directly control the enterprise. The VIE structure is often referred to as the Sina-model because it was first deployed in 2000 by Chinese Internet company Sina.

Under the VIE structure, two entities are created: one is offshore and the other is in China. PRC individuals and foreign investors first establish an offshore entity in the Cayman or other British Islands so that foreign investors are able to inject capital into that entity; in turn they can acquire ownership in offshore assets. The first entity then sets up a wholly foreign-owned enterprise (WFOE) in China as a direct subsidiary. This subsidiary in China sets up one or more domestically licensed companies as its operating companies, and these domestically licensed companies are called VIEs.[570] The China subsidiary sits between the off-shore firms and the VIEs. Via a series of contractual agreements with the Chinese subsidiary, the VIEs enable the overseas-listed company to effectively run its operations inside China.

Besides Sina, other major Chinese Internet companies like Baidu, Tencent, Tudou, Sohu.com, and Alibaba's rival JD.com have been listed on the stock markets in the US, Hong Kong, and Shanghai using the VIE structure.[571] Chinese e-commerce giant Alibaba, which recently became the world's biggest IPO, is operating under the VIE structure as well. In 2011, the law firm *Cadwallader* reported in the *Financial Times* that

[570] Zeng Xianwu, "Variable Interest Entity Structure in China," *China Law Insight,* February 9, 2012, http://www.chinalawinsight.com/2012/02/articles/corporate/foreign-investment/variable-interest-entity-structure-in-china/; Complex Structure for Investing in China, *Matthews Asia Insight,* September 2012, http://matthewsasia.com/perspectives-on-asia/asia-insight/article-560/default.fs.
[571] Joy Shaw and Lisa Chow, "China VIE structure may hold hidden risk," *Financial Times*, November 11, 2011, http://www.ft.com/intl/cms/s/2/0a1e4d78-0bf6-11e1-9310-00144feabdc0.html#axzz2Pv2dezjE.

42 percent of Chinese companies listed on the US stock exchange are using the VIE structure, with thousands of unlisted companies operating in the same way.[572]

The Chinese party state is well aware that many of its Internet firms use VIEs to draw in foreign capital, and that foreign capital uses VIEs to invest in the restricted Chinese Internet industry. Periodically, there have been rumors that the state would perhaps regulate the VIE structure. In 2006, the Ministry of Information, which regulates Internet firms, said it was taking a look at the VIE practice. In 2009, three other ministries announced that VIEs were banned for companies involved in Internet gaming.[573] More recently, in 2011, *Reuters* reported that the China Securities Regulatory Commission (CSRC) had asked the government to regulate VIE corporate structures. Yet, so far, the Chinese Party State has maintained its ambiguous policy stance and has never declared VIEs to be illegal or actually attempted to clamp down on the system and practice. What then is the reason for the Chinese Party state not taking action against VIEs to restrict foreign capital into Chinese strategic industries? On the flip side, according to a report by the U.S.-China Economic and Security Review Commission, US shareholders in Chinese Internet firms face "major risk" because Chinese courts might not hold that those contractual agreements are legal. Why then do US investors continue to invest in Chinese Internet firms in this manner?

There is a mutual understanding among transnational capitalists that the Chinese state would be unlikely to take any measures that affect major Internet firms anytime soon because "there are so many of them in existence and due to the fact that the

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[572] Kathrin Hille, "Foreign internet presence in China to face scrutiny," *Financial Times*, September 1, 2011, http://www.ft.com/intl/cms/s/2/7f8645e2-d493-11e0-a42b-00144feab49a.html.
[573] "China's murky ownership rules who owns what?" *Economist,* July 7, 2011, http://www.economist.com/node/18928526.

financial interests involved are already massive."[574] Alibaba's CEO Jack Ma, in his talk at China 2.0 conference in 2011 at the Stanford University Graduate School of Business, assured the audience that the PRC would not regulate the VIE structure given that so many Chinese Internet firms commonly operate as VIEs.[575] In other words, transnational capital is so deeply interwoven into the development of Chinese Internet industry that it is hard to untangle without harming domestic capital and party-state elites own financial interests as well. This is not an accident; rather, it is the direct result of Chinese party state policy in the process of shifting its economy to being more market-oriented, absorbing transnational capital in order to reintegrate into the global capitalist economy. Thus, the rise of Chinese Internet firms like Baidu is tightly intertwined with the interests of transnational and domestic capital, and domestic and transnational capital classes. As Zhao posits, the defining feature of the information industry in China is that it developed during a period of market liberalization, globalization, and transnational integration.[576] The ascendance of Baidu and other Internet firms needs to be situated within this context.

The Rise of Baidu

Baidu was co-founded in 2000 by Robin Li and Eric Xu, Chinese nationals educated in the United States. Current CEO Li studied computer science at the State University of New York (SUNY) at Buffalo and worked at Dow Jones & Co. in Princeton, New Jersey, and Infoseek, an early search engine firm partly owned by Disney, as a search engine engineer. Xu, a former Xerox employee, has a Ph.D. in

[574] Richard Pearson, "Looking at Chinese VIE's," *Forbes*, October 18, 2012, http://www.forbes.com/sites/richardpearson/2012/10/18/looking-at-chinese-vies/.
[575] China 2.0: Transforming Media and Commerce," *Stanford Program on Regions of Innovation and Entrepreneurship*, September 20, 2011, http://sprie.gsb.stanford.edu/events/china_20_transforming_media_and_commerce/.
[576] Zhao, *Communication In China*, 154.

biochemistry and is well-connected in Silicon Valley. In 1999, the two raised $1.2 million in seed money from Silicon Valley venture capital firms Integrity Partners and Peninsula Capital and returned to China.[577] On January 18, 2000, with that seed money and using the VIE structure, they co-founded Baidu, which was incorporated in the Cayman Islands as Baidu.com. In 2005, Goldman Sachs and Piper Jaffray (PJC), along with Credit Suisse First Boston (CS), underwrote Baidu's IPO and listed it on the NASDAQ stock exchange. Baidu's IPO was considered the biggest opening on NASDAQ since the dot.com peak of 2000. Soon after its IPO, Baidu secured another $10 million from two other US venture capital firms, Draper Fisher Jurvetson and IDG Technology Venture.[578] The 2010 Report to Congress of the US-China Economic and Security Review Commission stated that Baidu's initial majority investors were Americans and American firms.[579] Ironically, Google – Baidu's competitor in China – even bought a 2.6 percent share of Baidu in 2005, and sold the shares with 1100% return as the company started its own operations in China. As of 2013, 63% of Baidu's shares are held by 471 financial institutions,[580] including Baillie Gifford & Co, Price (T.Rowe) Associates Inc., Oppenheimer Funds Inc. etc.[581] – Baillie Gifford & Co, Price (T.Rowe) Associates and others are also top shareholders of Google.[582]

[577] David Barboza, "The Rise of Baidu," *New York Times*, September 17, 2006, http://www.nytimes.com/2006/09/17/business/yourmoney/17baidu.html?pagewanted=all.
[578] Ibid.
[579] Report to Congress of the U.S. China Economic and Security Review Commission, 100th Cong., 2nd sess (Washington, DC: U.S. Government Printing Office, 2010), 231, http://origin.www.uscc.gov/sites/default/files/annual_reports/2010-Report-to-Congress.pdf.
[580] "Baidu Inc.," Yahoo Finance, http://finance.yahoo.com/q/mh?s=BIDU.
[581] "Baidu Inc.," Financial Times, http://markets.ft.com/research/Markets/Tearsheets/Business-profile?s=BIDU:NSQ.
[582] Google Inc. Financial Times, http://markets.ft.com/research/Markets/Tearsheets/Business-profile?s=GOOG:NSQ.

Baidu is a typical Chinese Internet startup nurtured by the Chinese state and by transnational capital during the late 1990s, even while the investment of Chinese venture capital in Chinese Internet startups slowly rose to today's levels. Like other search firms, the majority of Baidu's revenues still come from search advertising, but it has attempted to diversify its revenue stream. While Baidu relies on Chinese advertisers to reach China's burgeoning consumer population, it also depends on many US advertisers that utilize Baidu to tap into the domestic and growing overseas Chinese market. Baidu has not revealed how many of its advertisers are US-based or from other foreign countries, but the number is expected to grow according to Scott Kessler, an analyst for Standard & Poor's equity research services.[583] As part of its strategy, Baidu is also aggressively building partnerships with foreign- as well as booming domestic IT companies. For foreign companies, partnership with Baidu is a way to break into the Chinese information market.

In 2006, Baidu struck a deal with MTV to provide television and music content to Baidu. The company teamed up with Providence Equity Partners – one of Hulu's investors – to inject $50 million into the creation of licensed online video platform *qiyi.com*,[584] established a joint venture with Japan-based Rakuten to operate a Business-to-Consumer (B2C) online shopping service in the Chinese market, entered into a cooperative agreement with Nokia, and worked with Intel to develop search services for home PCs, laptops and mobile phones. Baidu partnered with Dell, Inc. to develop tablet

[583] Pete Barlas, "More US Companies Trying Baidu Ads China Market A Strong Lure Advertisers ramping up efforts with largest nation's dominant search engine," *Investor's Business Daily*, February 16, 2011: A04.
[584] Robin Wauters, "Baidu acquires dominant stake in online video firm iQiyi, buys out ex-Hulu investor Providence," *TNW,* November 2, 2012, http://thenextWeb.com/asia/2012/11/02/baidu-acquires-majority-stake-in-online-video-firm-iqiyi-buys-out-ex-hulu-investor-providence/.

computers and mobile phones to target the Chinese market dominated by Apple and the Chinese company Lenovo – itself the buyers of IBM's PC business. Recently, Baidu reached an agreement with BMW to bring self-driving cars to China under the project name called "Vision Zero" showing its ambition beyond traditional Internet sector. In the deal, Baidu will provide the map and content services while BMW supplies the vehicles. By partnering in these ways, Baidu has strategically integrated deeply into the global information sphere and expanded its business across the market.

The rise of Baidu in China has often been attributed by the Western media as the result of Google's partial withdrawal from China in 2010 and Chinese government policies favoring Chinese-owned companies. After Google moved its operations to Hong Kong, *Business Week* reported that "Baidu will now enjoy near-monopoly status" in the Chinese search market. This prediction is only partially correct. Indeed, after Google's partial departure, Baidu was at once able to raise its market control to 80%, but that was only a brief aberration. As of 2014, Baidu controls 58.76%, while its domestic rival 360 Search shares 25.41%, Sogou 12.58%, and Google has 1.34%.[585] By no means has the search engine market in China stabilized with Baidu seemingly reigning over the domestic search market. Baidu is facing fierce competition among fast-growing Chinese homegrown Internet firms, so its continuing dominance is not assured in the rapidly changing information landscape in China despite Google's partial departure.

[585] Bruce Einhorn "Qihoo takes on Baidu in China's Search Engine Wars," *Bloomberg Business Week*, January 31, 2013, http://www.businessweek.com/articles/2013-01-31/qihoo-takes-on-baidu-in-chinas-search-engine-wars; Steven Millward, "Baidu down, Qihoo up, Google dead: 2013 was a year of drama for China's search engines," *Tech In Asia*, January 7, 2014, http://www.techinasia.com/how-baidu-qihoo-google-performed-in-china-in-2013/; Top Chinese Search Engines, *Chinese SEO Shifu,* April 10, 2014, http://chineseseoshifu.com/blog/top-5-chinese-search-engines.html.

Fierce Competition

The search engine market in China is highly dynamic, unstable and competitive. One of Baidu's newly emerged contenders is Qihoo, founded by a former Yahoo! Executive[586] and initially backed by the venture capital firm Sequoia Capita,[587] which was also a major backer of Google. In addition to Sequoia, Qihoo is supported by both Chinese and foreign venture capital firms such as IDG Ventures, Highland Capital Partners, Trustbridge partners, and Chinese private equity firm CDH. The company is best known for being China's largest antivirus software vendor, but it launched a search engine called so.360.cn, then used it in place of Google as the search engine on its portal. As of 2014, Qihoo runs the second largest search engine and browser in China.[588] During its initial public offering in 2011, Qihoo 360 Technology raised $175 million in the biggest IPO by a Chinese company in the US that year.[589] Citigroup and UBS investment bank underwrote the IPO, which meant that the banks had committed to purchase a certain amount of Qihoo shares at an agreed-upon price, and listed it on the NASDAQ in 2011.[590]

Shortly after launching its new search engine, Qihoo introduced its own Web portal site hao.360.cn and its own browser the 360 Browser. So far Qihoo is chipping away at

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[586] Paul Mozur, "Qihoo 360's Zhou Hongyi: Taking Aim at China's Internet," *Wall Street Journal*, November 30, 2012, http://online.wsj.com/article/SB10001424052970204707104578094460340552442.html.
[587] Matt Marshall, "Yahoo China to file aggressive suit against Qihoo nemesis," *Venture Beat,* November 2, 2006, http://venturebeat.com/2006/11/03/yahoo-china-hits-back-at-qihoo-nemesis/.
[588] Benjamin Pimentel, "Qihoo shares more than double in IPO," *Market Watch*, March 30, 2011, http://www.marketwatch.com/story/qihoo-shares-more-than-double-in-ipo-2011-03-30-1122190.
[589] Nisha Gopalan and Joan Solsman, "Qihoo Tops Chinese IPOs in U.S. This Year," *Wall Street Journal*, March 20, 2011, http://online.wsj.com/articles/SB10001424052748703712504576232084175020582; Matt Marshall, "Sequoia Capital's romp around the world: Qihoo, Jajah, Sipera & AdBrite," *Venture Beat,* March 20, 2006, http://venturebeat.com/2006/03/20/sequoia-capitals-romp-around-the-world-qihoo-jajah-sipera-adbrite/.
[590] Gopalan, and Solsman, "Qihoo Tops Chinese IPOs in U.S. This Year."

Baidu's search market share, and Baidu has responded by blocking Qihoo from access to its products and services. Baidu also took legal action against Qihoo 360, claiming that Qihoo 360 violated its robot exclusion protocol by indexing its Web content without permission.[591] In response to the lawsuit, Qihoo argued that Baidu's actions violated China's anti-monopoly laws.[592] To ease the tension between these competitors, the Internet Society of China, a government-backed trade group, stepped in and got search companies and other Internet firms including Baidu, Qihoo 360, Tencent, Sina etc. to agree to sign a self-regulation pact including a code of conduct to maintain fair competition.[593] This "self regulation" can be seen as weakening the role of the Chinese state in the new market-oriented economy. However, as Yuezh Zhao succinctly posits, "self regulation" is a way for the Chinese state to couch the market as a benevolent, non-political entity.[594] It is part of the Chinese state's neoliberal strategies where the party state distances itself from the market yet maintains its influence and strategically facilitates the commercialization processes.

In the midst of its battle against Baidu, Qihoo teamed up with China's e-commerce giant Alibaba to launch 360.etao.com, an online shopping search engine. This move is an aggressive strategy by Qihoo and Alibaba meant to grab market share from Baidu's dominance in the Chinese search engine market. Besides search, Qihoo offers competing services like vertical search engines specializing in music, software, and mapping

[591] Ellyne Phneah, "Baidu takes Qihoo 360 to court over search dispute," *ZDNet*, February 22, 2013, http://www.zdnet.com/cn/baidu-takes-qihoo-360-to-court-over-search-dispute-7000011649/.
[592] Ibid.
[593] Michael Kan, "China's Baidu and Qihoo 360 sign pact meant to resolve dispute," *PC World*, November 2, 2012, http://www.pcworld.idg.com.au/article/440847/china_baidu_qihoo_360_sign_pact_meant_resolve_dispute.
[594] Yuezhi Zhao, *Communication In China*, 33.

services.[595] Qihoo 360 had a hiring spree for its search unit, specifically targeting and recruiting employees from Baidu, as well as search teams from Tencent and Sohu.[596]

Trailing Qihoo is Soguo, a subsidiary of Web portal Sohu and a long-time player in the Chinese search market. Sohu was the first Chinese language search engine/portal in China. The company was founded by ChaoYang Zhang, who received his PhD in experimental physics from MIT in 1993. Zhang left his position as MIT's liaison officer for China and returned to China in order to start his own company, Internet Technologies China (ITC), with help from MIT media lab director Nicholas Negroponte – the One Laptop per Child (OLPC) evangelist – and Edward Roberts of MIT's Sloan School of Management. ITC later changed its name to Sohu.[597] In 2004, Sohu launched an updated search engine called Sogou. As the search engine market heated up in 2012, Sohu announced that the company would join the search engine battle between Baidu and latecomer Qihoo. However, since then, Sogou has sought buyers, spurring interest from domestic Internet giants Baidu, Tencent and Qihoo 360.[598] The company had been holding a solid 10% share of the search market, but has not been able to sustain growth, facing competition from Baidu and Qihoo. From its competitors' point of view, Sogou's 10% was vital enough to shift the balance of the search engine market. For Baidu, keeping Sogou out of Qihoo's hands was necessary in order to maintain its dominance

[595] Catherine Shu, "Qihoo 360 Partners With Alibaba To Grab Market Share Away From Chinese Search Giant Baidu," *Tech Crunch*, May 21, 2013, http://techcrunch.com/2013/05/21/qihoo-alibaba/.
[596] Doug Tsuruoka, "Qihoo 360 Search Unit Reportedly Hiring More Staff," *Investor's Business Daily*, November 13, 2013, http://news.investors.com/technology/111312-633269-qihu-said-ramping-up-search-hiring.htm.
[597] Wenxian, Zhang, Huiyao Wang, and Ilan Alon. *Entrepreneurial and Business Elites of China: The Chinese Returnees Who Have Shaped Modern* China (Bingley: Emerald Group Pub., 2011), 219.
[598] "Sogou attracts interest from Baidu, Tencent, Qihoo 360," *Want China Times*, Mary 23, 2013, http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20130523000057&cid=1202.

and protect its share of the market it now enjoys.[599] However, in 2013, Sogou made a deal with Tencent, which invested US$ 448 million for a 36.5 percent stake in the company and merged with Tencent's search engine SoSo, which had a smaller market share. After the deal, Sogou's market share rose to 12%, and Tencent-backed Sogue is now planning for its own IPO.

Tencent – founded by Pony Ma, the third-richest man in China – is another major player in the Chinese Internet market and often ranked as the third largest Internet company in the world behind Google and Amazon, with market capitalization of $132 billion. Tencent is more known for its core Instant Message (IM) product QQ and for gaming, but it jumped into the search market, and developed its own search engine called SoSo (meaning "search search") and e-commerce portal. Initially Tencent partnered with Google's search ad platform, but in 2009 it decided to replace Google with its own ad platform.[600] While Tencent is a small player in desktop search with slightly over 3.5% market share, it is a bigger player in mobile search and online games. After acquiring the 36.5% stake of Sogou owned by Chinese search engine Sohu, the two joined forces to challenge Baidu. About half of Tencent's revenue was from online gaming, with another fifth coming from products like the mobile chat service WeChat/Weixin – which has over 300 million registered users – instant messaging service QQ, etc. [601] The company is

[599] "China's Browser Wars: Sogou on Sale?" *Barron's*, http://blogs.barrons.com/emergingmarketsdaily/2013/05/23/chinas-browser-wars-sogou-on-sale/?Mod=WSJ_blogs_mostpop_read.
[600] Sarah Lacy, "What Valley Companies Should Know about Tencent," *Tech Crunch*, June 20, 2010, http://techcrunch.com/2010/06/20/what-valley-companies-should-know-about-tencent/.
[601] "Tencent Chief Ma Passes Baidu's Li in Wealth: Chart of the Day," *Bloomberg News,* May 17, 2013, http://www.bloomberg.com/news/articles/2013-03-17/tencent-chief-ma-passes-baidu-s-li-in-wealth-chart-of-the-day; Michael Kan, "China's Tencent expands search engine presence with Sogou deal," *PC World*, September 16, 2013, http://www.pcworld.com/article/2048843/chinas-tencent-expands-search-engine-presence-with-sogou-deal.html.

more than 30 percent owned by South African media group Naspers Ltd, who also owns shares of Facebook and Mail.ru (MAIL), the largest Russian-language Internet firm.

Meanwhile, e-commerce giant Alibaba rolled out its own general search engine called Aliyun or Alibaba Cloud Search – the same brand as its mobile operating system. Under its cloud computing division, Aliyun offers the basic features of search: Internet, news, images and maps, and competes directly with Baidu.[602] This is not the first time that Alibaba has entered into the search market. In 2010, it partnered with Microsoft and launched the shopping search engine Etao.com.[603] And to tackle China's mobile search market, in 2014, Alibaba formed a joint venture with Chinese browser developer UCWeb called Shenma. Alibaba CEO Jack Ma voiced his domestic ambition, saying at the time "What Alibaba is going to do is to challenge the flagship of the industry and trigger benign competition"[604] while it also aims to take its e-commerce business to emerging markets.

If Alibaba is ambitiously moving into Baidu's territory, Baidu is looking to carve out its own space in Alibaba's lucrative e-commerce market. In an attempt to directly challenge Alibaba's Taobao (TMall) dominance in e-commerce with over 80% market share, Baidu set up an e-commerce department in October 2007, and its C2C platform Youa, backed by venture capital like IDG-ACCEL and Qiming Venture Partners, opened in October 2008, but failed less than 3 years later. Since then, Baidu has attempted

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[602] Gregg Sterling, "Alibaba Creates Aliyun Search Engine To Challenge Baidu, Google In China," *Search Engine Land,* February 19, 2013, http://searchengineland.com/alibaba-creates-aliyun-search-engine-to-challenge-baidu-google-in-china-148992.

[603] Josh Ong, "Alibaba's new Aliyun search engine raises the stakes in its feud with Google and Android," *TNW,* February 19, 2013. http://thenextWeb.com/asia/2013/02/19/alibabas-new-aliyun-search-engine-raises-the-stakes-in-its-feud-with-google-and-android/.

[604] Dan Zhang, "Alibaba vs. Baidu: Can e-commerce trump search?" *ZDnet*. September 26, 2011, http://www.zdnet.com/blog/china/alibaba-vs-baidu-can-e-commerce-trump-search/128.

several other e-commerce ventures without success.[605] Will Baidu completely relinquish China's e-commerce market estimated to be worth between $420-$650 billion by 2020?[606] The answer is no. In 2014, Baidu has joined forces with Tencent and the Dalian Wanda Group, the Chinese real estate, cinema and retail conglomerate, and once again entered into the e-commerce business against Alibaba. The three companies are set to launch Wanda E-Commerce, in which Baidu and Tencent would each hold a 15 percent stake. They plan to invest about $811 million in so-called online-to-offline business ventures where Wanda's nationwide offline chain of 107 malls and department stores are integrated with the utility and popularity of Baidu's and Tencent's online search, social networking and payment services.[607] To defend itself, Alibaba has embarked on a similar initiative into online-to-offline ventures, investing nearly $700 million to acquire a minority stake in the Intime Retail Group, which operates 36 department stores and shopping centers around the country. [608] And recently Tencent built a partnership with China's number 2 online retailer JD.com, preying on Alibaba's weakness in mobile business.

Similar to the US market, as Chinese Internet firms diversify their accumulation strategies, they move into each other's territories of search, social media, browsers, mobile phones, music, games, video, e-commerce, and "Internet of things" all predicated

[605] Kevin Huang, "Baidu's New Ecommerce Journey: may Fail Again," *Internet Change China*, July 12, 2012, http://www.ichangechina.com/baidus-new-ecommerce-journey-may-fail-again/; Doug Young, "Baidu Diversification Sputters With E-Commerce Flop," *Forbes*, April 25, 2012, http://www.forbes.com/sites/techonomy/2012/04/25/baidu-diversification-sputters-with-e-commerce-flop/.
[606] Robert O'Brien, "China's E-Commerce Market: Growing in Size, Importance, and Dynamism," *Context Chin*, April 26, 2013, http://contextchina.com/2013/04/chinas-e-commerce-market-growing-in-size-importance-and-dynamism/.
[607] Neil Gough, "To Compete Against Alibaba, Wanda Joins Forces With Baidu and Tencent," *New York Times*, August 29, 2014, http://dealbook.nytimes.com/2014/08/29/to-compete-with-alibaba-a-chinese-e-commerce-company-is-born/?_php=true&_type=blogs&_r=0.
[608] Ibid.

on continuing commodification of the Internet. For defensive and offensive purposes, Baidu is also pursuing a strategy of vertical integration by acquiring e-book sellers (Fanshu.com), a travel-booking service (Qunar.com), e-commerce sites (Yougou.com, 360buy.com, tg.com.cn, yaodian100.com), an online community (jingtime.com) and a housing information portal (anjuke.com).[609] In 2013, Baidu acquired online video provider PPS for $379 million and merged it with its own video platform, iQiyi, to compete with the top Chinese video business Youku Tudou – which had received a $1.22 billion investment led by Alibaba. iQiyi also launched an in-house film studio – similar to Google's YouTube tactic for original content creation – to produce domestic and Hollywood films while it has been working with movie studios to produce TV shows. Baidu's main business and the majority of its revenue is still desktop search, but, as the company diversifies, it faces fierce competition from social media, e-commerce, video companies such as Alibaba's e-commerce, Tencent's QQ SMS, Sina's Weibo twitter-like microblogging service, and Renren, China's Facebook clone.

While Chinese Internet firms are competing with each other over these new markets, there are other contenders to Baidu that are barely on the western media radar – Chinese party state information service outlets. China Central Television (CCTV), People's Daily and Xinhua are all flexing their muscles to expand their businesses into the increasingly lucrative Internet market and compete with privately owned Internet firms. In the process of "opening up," the state-run media firms *People's Daily*, *Xinhua* and *CCTV* have restructured and integrated into the market by incorporating private capital. The Chinese Communist party elites have vested interests in the market and have

[609] Normandy Madden, "With Google Gone, Baidu Moves Beyond Search in China But Faces Local Rivals," *Ad Age,* December 8, 2011, http://adage.com/article/global-news/baidu-moves-search-china-faces-local-rivals/231444/.

become major players across the information sectors as the state assets have corporatized, commercialized and capitalized.[610] This process is far from over. The state run companies are in the midst of undergoing additional restructuring processes in order to take part in the profit of the Internet – a new site of capital accumulation – as they compete and collaborate with private Internet firms.

People's Daily started to build its online operation in 1997 when it launched *People's Daily* Online (People.cn Co.), an online portal for *People's Daily*. The newspaper's Internet venture was primarily viewed as the Chinese party State's effort to propagate its party agenda through new media, but it is equally a business imperative as a commercialized press in order to cope with the shifting information industry. In 2010, as part of an effort to expand its private capital, *People's Daily* also built its own news search engine called Jike, hoping to tap into the burgeoning search engine market. Not surprisingly, Jike was not able to make even a dent against domestic competitors Baidu, Qihoo and Sogou and failed, but the state media has not given up on the search business and relaunched a new search engine called ChinaSo in 2014 by merging Jike and Xinhua's search engine Panguso.[611] This might not be the last attempt for *People's Daily*.

Considering the changing information market environment, state capital has been pressured to expand its own operations to the Internet as it attempts to increase revenues by injecting more private capital into its business.[612] People.cn Co. has not shied away from its market-oriented business model. The company described its business as a "market-oriented" commercial news portal which has benefited from transnational

[610] Zhao, *Communication In China*, 75-135.
[611] Phill Muncaster, "Chinese government buids its own 'ChinaSo' search engine," *Register*, March 4, http://www.theregister.co.uk/2014/03/04/chinaso_search_engine_beijing_new/.
[612] Zhang Ye, "Xinhua online portal files for IPO," *Global Times*, June 29, 2014, http://www.globaltimes.cn/content/868059.shtml.

capital[613] and expressed that "it needs to accelerate its restructuring drive and 'take active measures' to compete with those commercial rivals."[614]

One of People.cn Co.'s defensive and offensive measures was moving toward an IPO in order to raise more private capital on the global financial market. In 2012, *People's Daily* Online Co. launched its IPO on the Shanghai Stock Exchange and raised $222 million, three times what it initially expected.[615] People.cn Co. is the first Chinese state-owned information outlet that has gone public. As the *Financial Times* reported, "this is the first time a Chinese state media company's listing includes not just commercial but also editorial assets."[616] People.cn received investments from many large state-owned enterprises including People's Daily, China Mobile Ltd, China Unicom and China Telecom Corp Ltd.[617]

While *People's Daily* and many other Chinese state information outlets have been building online operations from early on, compared to privately held Internet firms like Baidu, Tencent, Sina, Sohu, they are still relatively small scale. Through its IPO, *People's Daily* Online intended to inject more private capital into its coffers and expand its business as it continues to integrate into the global capitalist information market. The company is ready to use new capital to upgrade its technology including mobile delivery and content,[618] as it shifts into the mobile market and expands to include video services,

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[613] Lingling Wei, "Website of China Communist Party Mouthpiece Plans IPO," *Wall Street Journal,* January 10, 2012, http://online.wsj.com/article/SB10001424052970204124204577150563664941658.html.
[614] Ibid.
[615] "People's Daily website raises $222m via share sale," *BBC News*, April 20, 2012, http://www.bbc.com/news/business-17781024.
[616] Hille, "People's Daily Online plans Shanghai listing."
[617] Samel Shen and Melanie, "China's party mouthpiece Xinhuanet applies for Shanghai IPO," *Reuters*, 2013, http://ru.reuters.com/article/idUKBRE90604420130107.
[618] Zijing Wu, "People's Daily Site Raises $222 Million in Enlarged IPO," *Bloomberg*, April 19, 2012, http://www.bloomberg.com/news/2012-04-18/china-s-party-Website-people-cn-seeks-18-ipo-premium.html; Dexter Roberts, "China's Hot New Tech Stock Offering: The People's Daily," *Bloomberg*

online news services, gaming platforms etc.[619] After People.cn Co.'s IPO, Xinhua and CCTV have followed suit and are preparing for IPOs on the Shanghai Stock Exchange.

CCTV has already moved a large portion of its content – ranging from news, drama and variety shows – online to CCTV.com. It is planning to team up with China Mobile to launch an Internet TV station as CCTV's online video platform.[620] This initiative is motivated by private online video companies like Youku Toudu Inc. and Baidu's iQiyi.com, which started to compete with CCTV for advertising revenues.[621] In fact, CCTV has dominated the advertising business for the last 20 years, but the emergence of privately-owned Internet firms has changed the dynamic of the industry and chipped away at its advertising market share. In 2012, while CCTV had an ad income of US$4.3 billion,[622] Baidu's ad income reached US$3.6 billion.[623] If Baidu is able to continue to grow at its current rate, it will easily pass the broadcaster's ad revenue soon. Baidu's new video platform iQiyi.com is directly threatening CCTV. In The *Wall Street Journal,* a CCTV spokesman bemoaned the difficulties for state-owned, less marketized information firms to compete with newly emerged private Internet firms in a fully open and competitive Internet market.[624] There is a growing pressure on Chinese state capital like CCTV.

Business Week, April 20, 2012, http://www.businessweek.com/articles/2012-04-20/chinas-hot-new-tech-stock-offering-the-peoples-daily.

[619] "People's Daily Online Kicks Off IPO Roadshow," *Marbridge Daily,* April 11, 2012, http://www.marbridgeconsulting.com/marbridgedaily/2012-04-11/article/55134/peoples_daily_online_kicks_off_ipo_roadshow.

[620] Raymond Li, "CCTV and China Mobile to launch Internet TV station," *South Morning China,* February 20, 2009, http://www.scmp.com/article/670554/cctv-and-china-mobile-launch-internet-tv-station.

[621] "China's CCTV advertising sales hit 19-year high at $2.5 bln," *Reuters,* November 18. 2012, http://www.reuters.com/article/2012/11/19/china-cctv-adsales-idUSL4N08Z10Z20121119.

[622] "Baidu: putting TV ads down for the count?" *Want China Times*, March 13, 2013, http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20130314000051&cid=1502.

[623] Ibid.

[624] Loletta Chao, "China Media Push into the Web," *Wall Street Journal,* March 8, 2011, http://online.wsj.com/articles/SB10001424052748703386704576186402009111630.

The tension between CCTV and Baidu is illustrated in CCTV's hostile coverage of Baidu. In 2011, CCTV ran a series of critical stories about Baidu's ad sales practices by revealing false ads on Baidu. This led the Baidu vice-president for sales to apologize on CCTV to viewers affected by fraudulent information, and promising stricter censorship and policies in its sales procedures.[625] The scrutiny of Baidu could be seen as CCTV's outstanding journalistic standard, but CCTV's critical report on Baidu also needs to be set next to the fact that Baidu and CCTV are fighting for the same online ad revenues.[626] One of the reasons for CCTV to launch its own search engine is reciprocally to better compete with Baidu and other internet firms on that important turf.

Chinese state run news agency Xinhua also joined the race for Internet business by building its online unit Xinhuanet.com in 1997. In 2011, Xinhua released its own search engine, Panguso.com, in partnership with state-owned telecommunications carrier China Mobile, which came on the heals of the *People's Daily* starting its own search engine, Goso.cn.[627] The news agency is also venturing out to social media, offering its own Twitter-like messaging service. State run information outlets have long been commercializing their businesses, but they are renewing their ambition to do so in the Internet market.[628] In January of 2011, Xinhua unveiled its first research center – called Xinhuanet Industrial Park – built to develop new media products in China's New Media Development Zone in southern Beijing. Li Congjun characterized the construction of Xinhuanet Industrial Park as a strategic move to expand Xinhua's media businesses and

[625] Kathrin Hille, "Baidu's shares fall after attacks by CCTV," *Financial Times*, August 19, 2011, http://www.ft.com/intl/cms/s/0/6b065c2e-ca43-11e0-a0dc-00144feabdc0.html#axzz2UNFELVUd.
[626] Melanie Lee, "CCTV Criticism of China's Baidu May Mask Competition Issues," *Hollywood Reporter,* August 18, 2011, http://www.hollywoodreporter.com/news/cctv-criticism-chinas-baidu-may-225153.
[627] Loretta Chao, "China's state media push deeper into the Web," *Wall Street Journal,* March 8, 2011, http://online.wsj.com/article/SB10001424052748703386704576186402009111630.html.
[628] Ibid.

enhance its online competitiveness. According to the *Global Times*, Xinhuanet has decreased its reliance on the government's service purchases and fees, and the Chinese government has spurred state-backed media to seek IPOs to raise private capital in order to compete with private Internet companies.[629] While a majority of the company's revenue – 63.67% – now comes from online advertising, Xinhuanet's mobile accounts still only account for 8.37%. [630] The company understands the significance of competing in and expanding its mobile Internet business, so it plans to invest in mobile Internet infrastructure with new capital from its IPO. Xinhua has hired China International Capital Corp. as an underwriter and filed for an IPO in Shanghai in 2014.

Re-convergence

These private and commercialized state run Internet firms are all now re-converging in the rapidly growing mobile market which will be a major revenue source in the future. In 2014, China became the largest mobile market in the world by revenue[631] and there are about 632 million people accessing the Internet in China, with approximately 75% of this number through mobile technologies.[632] Given the importance of the mobile market, Baidu has been injecting a large amount of capital into the mobile market as well as cloud computing through which run mobile apps, software, data and services. Utilizing its dominance in desktop search and its brand name**,** Baidu has become the frontrunner in the mobile search engine market.

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[629] Zhang Ye, "Xinhua online portal files for IPO." *Global Times,* June 29, 2014, http://www.globaltimes.cn/content/868059.shtml.
[630] Ibid.
[631] Simon Zekaria, "China is Projected to Overtake the US in Mobile Revenue," *Wall Street Journal*, May 28, 2014, http://blogs.wsj.com/digits/2014/05/28/china-projected-to-overtake-the-us-in-mobile-revenue/.
[632] John Mylant, "China's Mobile Advertising Market Is Still Young - Watch Baidu As It Matures," *Seeking Alpha*, March 27, 2013, http://seekingalpha.com/article/1303061-china-s-mobile-advertising-market-is-still-young-watch-baidu-as-it-matures; Nick Zhou, "China Mobile Search Engine Market Update," *China Internet Watch*, May 29, 2013, http://www.chinainternetwatch.com/2218/mobile-search-engine-market-q1-2013/#more-2218.

Baidu entered the mobile market relatively late. Its first move for mobile business was in 2011 with the launching of Baidu Yi, its own mobile operating system, to integrate its range of services into mobile devices. Baidu Yi is based on Google's Android operating system, but as Amazon did for its Kindle Fire, Baidu forked (modified) Android OS, replaced Google services and directly integrated Baidu services including mapping services, an ereader, music services etc.[633] Baidu began to build strategic partnerships with domestic and transnational telecom and mobile device companies in China to carry its Internet services. In 2011, Baidu started its own smart phone with US hardware vendor Dell running on its cloud-based Baidu Yi. This major attempt failed as Dell's phone did not sell well; rather, low-end Baidu Cloud phones from China's Changhong and TCL Corp generated more sales than the high-end Dell model.[634] This hasn't deterred Baidu as the influx of mobile technologies is radically reorganizing the information industry as a whole.

Rather, Baidu has shifted its investments more toward mobile applications, including its mobile browser, mobile search, and Baidu Application Center. The key part of Baidu's strategic plan lies in the mobile cloud. The idea is that once Baidu has user information stored in its cloud services, it will discourage users from moving to other services or platforms. Google is already effectively using this strategy.[635] Baidu has invested $1.6 billion in a cloud computing center to further its mobile strategies. Baidu

[633] Geoff Duncan, "China's Baidu to launch Android –Based Mobile OS," *Digital Trends*, September 11, 2011, http://www.digitaltrends.com/international/chinas-baidu-to-launch-android-based-mobile-os/.
[634] Steven Milward, "Baidu Losing Dell as Smartphone Partner," *Tech In Asia,* December 17. 2012, http://www.techinasia.com/dell-baidu-partnership-android/.
[635] Kang Zhou, "Baidu in 2013, Needs Entry-Level Product to Access Mobile Internet Market," *TechNode,* February 10, 2013, http://technode.com/2013/02/10/baidu-in-2013-needs-entry-level-product-to-access-mobile-internet-market/.

had less than 10% of its total revenue coming from mobile ads a few years ago, but as of 2014, it had reached 30% of its total revenue coming from mobile.[636]

In the meantime, Easou Technology is trailing closely behind Baidu in the mobile search market. Easou, with headquarters in Shenzhen, started its business in 2005 as the first mobile search engine in China. Its revenue hit 300 million yuan in 2011.[637] While the company does not have a PC platform, it targets the small and medium business mobile market where users do not generally use PCs on a regular basis. Unlike Baidu, whose mobile advertisers are mostly larger companies shifting their advertising budgets from PC to mobile, Easou relies on small and medium advertisers.[638] Mobile search advertisements make up over 70 percent of Easou's revenues, due to increasing numbers of cheap smartphones and 4G network access; the rest comes from paid music, games and software downloads.[639] Since 2005, according to *China Daily*, Easou.com has received $50 million in four rounds of funding and is looking to go public on the NASDAQ.[640] In the last round of funding, SB China Venture Capital, the Hsinchu, Taiwan-based company, United Microelectronics Corporation and French venture capital company Ventech joined in the venture.[641]

Trailing behind Easou is Tencent, which was reorganized in 2012 in anticipation of growing profits from its mobile platform and heavy investment in the app and e-

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[636] "Mobile Advertising Fuels Boom for China's Search Engines," *Yahoo Finance,* August 5, 2014, http://finance.yahoo.com/news/mobile-advertising-fuels-boom-chinas-150000624.html.
[637] "Easou Wap Search Business Exceeds Baidu," *Green Technology World*, May 17, 2012, http://green.tmcnet.com/news/2012/05/17/6307952.htm; Danny Sullivan, "WML and WAP Search Engines," *Search Engine Watch*, February 19, 2002, http://searchenginewatch.com/article/2067285/WML-and-WAP-Search-Engines.
[638] "Mobile Advertising Fuels from Boom for China's Search Engine," *Market Watch,* August 5, 2014, http://www.marketwatch.com/story/mobile-advertising-fuels-boom-for-chinas-search-engines-2014-08-05.
[639] Shen Jingting, "Easou gets new round of funding," *China Daily*, April 5, 2011, http://europe.chinadaily.com.cn/business/2011-04/15/content_12333971.htm.
[640] Ibid.
[641] Ibid.

commerce space. Tencent is competing with Baidu and Alibaba over the mobile search market[642] and its mobile messaging app WebChat/Weixin grew to roughly 355 million monthly active users as of the end of 2013.[643] The company has diversified revenue sources, moving to games, subscription fees, and advertising, whereas Baidu concentrates on online advertising.[644] Tencent is trying to leverage its large user base against Baidu, and is also broadening its business spectrum on a global level by joining into partnerships with foreign companies. For example, Tencent teamed up with American Express to create Tenpay in order to provide a cross-border online payment platform to enable Chinese users to shop online on foreign Websites.[645] This move is a threat to China's top online payment system, Alibaba group's Alipay, which, since 2007, has provided a payment service enabling users to shop on more than 600 overseas Websites.[646] In response, Alibaba went on the offensive by acquiring stakes in Sina Corp's social-networking Website Weibo – a competitor of Tencent and navigation and maps firm AutoNavi.

Transnationalization

Given the ever-intense domestic capitalist rivalries within China as illustrated above, Baidu's dominant position in the Internet market continues to be challenged. Moreover, unlike its dominant position in the desktop market, Baidu has not been able to

[642] Michele Chandler "Alibaba, Tencent Battle for Search Dominance," *Investor's Business Daily*, January 22, 2015, http://news.investors.com/technology/012215-735793-baidu-competes-with-alibaba-tencent-in-mobile-search.htm.
[643] Kaylene Hong, "WhatsApp rival WeChat is narrowing the gap as it passes 355 million monthly active users," *TNW,* March 10, 2014, http://thenextWeb.com/apps/2014/03/19/whatsapp-rival-wechat-is-narrowing-the-gap-as-it-passes-355-million-monthly-active-users/.
[644] "Tencent Chief Ma Passes Baidu's Li in Wealth," *Bloomberg News*, March 17, 2013, http://www.bloomberg.com/news/2013-03-17/tencent-chief-ma-passes-baidu-s-li-in-wealth-chart-of-the-day.html.
[645] Owen Fletcher, "Tencent, AmEx partner on online payment services," *Market Watch*, September 28, 2011, http://www.marketwatch.com/story/tencent-amex-partner-on-online-payment-services-2011-09-28.
[646] Chen Limin, "Tencent, American Express create online payment service for overseas websites," *China Daily*, September 11, 2012, http://www.chinadaily.com.cn/business/2012-11/19/content_15943580.htm.

fully exploit the domestic mobile market yet. These factors are pressuring Baidu to look for overseas expansion of its business. Baidu's CEO Robin Li expressed that international expansion is an "important way" for the company to spur future growth; the company is investing 2 billion RMB in Shenzhen to build a new 220,000-square-meter complex for international operations. The Center is scheduled to open by 2015[647] and will focus on R&D for strategic projects including Internet operating system. The company also has a presence in the US with the opening of the Institute of Deep Learning in Silicon Valley dedicated to Artificial Intelligence (AI).[648] Baidu recently hired the leading AI researcher Andrew Ng to head Baidu's research. Ng was a professor at Stanford University and previously worked on deep learning at Google. And the company is in the process of establishing an R&D center in Brazil, working with two local universities.

Baidu's transnational ambitions go back to 2007 when the company first launched its Japanese services, partnering with Japanese e-commerce giant Rakuten; yet its global expansion has not been a smooth road. In Japan, Yahoo! dominates the market with over 50 percent market share – although Yahoo! search in Japan is powered by the Google search algorithm and Google also holds over 36% of the Japanese market.[649] Microsoft had attempted to convince Yahoo! Japan to use Bing's search algorithm, but this effort failed because SoftBank, the Japanese cellphone and Web giant and Yahoo! Japan's major stakeholder, refused their overture because of the larger benefit of using Google

[647] "Baidu to Build Southern China Office in International Push," *Bloomberg*, January 16, 2012, http://www.bloomberg.com/news/2012-01-16/baidu-to-build-southern-china-office-in-international-push.html; Jamie Yap, "Baidu preps for global expansion with new office," *ZDnet*, January 17, 2012, http://www.zdnet.com/baidu-preps-for-global-expansion-with-new-office-2062303526.
[648] Daniela Hernandez, "Chinese Google Opens Artificial –Intelligence Lab in Silicon Valley," *Wired*, April 12, 2013, http://www.wired.com/wiredenterprise/2013/04/baidu-research-lab/.
[649] Kenj Schaulzer, "Japan Search Engine Market Share 2013," *Search Blog Asia*, February 15, 2012, http://www.searchblog.asia/topics/seo/japan-search-engine-market-share-2012/.

search technology strength in Japanese language queries.[650] As a newcomer, Baidu was dealing with incumbents Yahoo! and Google, and was not able to make a dent in the Japanese search market. Yet, this has not deterred Baidu's global expansion efforts. Despite its unsuccessful venture in Japan, Baidu regrouped its global strategies and in 2011-2012 launched services in Vietnam, Thailand, Egypt, and Brazil followed by Indonesia to test those markets. These targeted countries may seem to be randomly selected, but Baidu's global strategy is calculated by targeting emerging markets and non-English territories.[651]

After Japan, Baidu launched a local-language version of its Web directory Hao123 in Thailand, which has 25 million Web users. The company slowly introduced new services, including anti-virus apps now being used by 3 million users.[652] The Chinese firm aims to make its site a business gateway for Thai companies exporting to China. Starting in 2011, Baidu offered the Vietnamese portal vn.hao123.com and Q&A service zhidao.baidu.com.vn followed by PostBar ("Baidu Tieba") and social network "Tra Da Quan" – which means "coffee shop" in Vietnamese. Yet, Baidu is not the only Chinese company that is transnationalizing its business. Baidu's domestic competitors have already entered Thailand, Vietnam and Indonesia where they compete with each other and alongside Google, Yahoo!, and Microsoft. In particular, Tencent WeChat mobile messaging app ranks 19th in popularity on Google Play and Apple Store in Vietnam, and has embarked on a joint-venture in Indonesia, the region's largest

[650] Hiroko Tabuchi, "Yahoo Japan Teams With Google on Search," *New York Times*, July 27, 2010, http://www.nytimes.com/2010/07/28/technology/28yahoo.html?_r=0.
[651] "How Baidu takes on Egypt and the world," *Chinese Speakers Bureau*, March 12, 2013, http://www.chinaspeakersbureau.info/2013/03/how-baidu-takes-on-the-egypt-and-the-world-kaiser-kuo/.
[652] "China's Weibo seeks Thai gateway," *Bangkok Post*, November 4, 2013, http://www.bangkokpost.com/print/344912/.

country.[653] In 2013, Sina Weibo also expanded its presence in Thailand via a partnership with Jiaranai Entertainment based in Bangkok.[654]

To assist its global expansion, Baidu has been increasing its R&D abroad and opened its overseas joint lab with the Institute for Infocomm Research (I2R) in Singapore to focus on research on natural language processing technology for Thai and Vietnamese as well as Arabic and Portuguese. While Baidu's move into Vietnam and Thailand seems a logical move considering their geographical proximity, what rationale could be behind targeting Egypt and Brazil? Historian Vijay Prashad, in his book *The Poorer Nations*, gives historical insight to understand Baidu's geographical expansion. He characterizes emerging countries like Brazil, China, Egypt etc. as "locomotives of the Global South" – countries having both high economic growth rates and which are demographically large – to promote South-South corporations. They were initially organized as an alternative to Western neoliberalism; however, with defeat of the non-Aligned Movement in the 1980s, they are integrated into global capitalist system and committed to "neoliberalism with southern characteristics."[655]

In fact, Brazil has led the way in South America. It has the largest Internet population in South America and is fifth in the world with nearly 107 million Internet users as of 2014. Additionally, Brazil has a lot of potential growth in this area – only 53 percent of its population currently has access to the Internet.[656] Baidu's strategy is not to

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[653] Jon Russell, "Tencent focuses on Indonesia with local joint venture to promote its WeChat mobile app," *TNW*, February 28, 2013, http://thenextWeb.com/asia/2013/02/28/tencent-focuses-on-indonesia-with-local-joint-venture-to-promote-its-wechat-mobile-app/.

[654] Jamie Yap, "Sina Weibo expands to Thailand," *ZDnet,* April 12, 2013, http://www.zdnet.com/th/sina-weibo-expands-to-thailand-7000013913/.

[655] Vijay Prashad, *The Poorer Nations: A Possible History of the Global South* (London: Verso, 2012), 7 - 11.

[656] See detailed statistics on Internet use in Brazil at http://www.statista.com/topics/2045/internet-usage-in-brazil.

convert Google users, but to attract new Internet users. Jonathan Dillon, head of Baidu's international business, considers Brazil its most important market outside China, saying, "Brazil is a growing economy with a flourishing internet industry."[657] Brazil is one of the most densely populated countries in the world, but US companies still have relatively less presence. To tackle this not-yet-fully-tapped potential growth market, Baidu and the world's second largest consumer electronics vendor Lenovo have banded together and released the Baidu cloud powered smartphone.[658] Baidu also recently obtained a controlling stake in Brazilian online-discount company Peixe Urbano to further its push into Brazil as it anticipates that the country's e-commerce market will grow 18% annually by 2016.[659]

The Middle East is another region with a burgeoning number of Internet users; yet, digital capital has also not yet fully exploited this region. In particular, Egypt is considered a strategic market by Internet firms because it is the most populous country in the Middle East and the third most populated in Africa. In 2011, Baidu introduced Arabic Baidu Zhidao, which allows users to post questions and privileges users for good answers. The object of Baidu Zhidao is a common way for search engine companies to develop much-needed Web content via free user labor in a market where there is little Web content available. With this content, Baidu is developing proficient search technology that works in Arabic – a widely spoken language.[660] Kaiser Kuo, Baidu's

[657] "Lenovo and Baidu target Brazil as high-growth market," *Want China Times*, January 17, 2013, http://www.wantchinatimes.com/news-subclass-cnt.aspx?id=20130117000071&cid=1102.
[658] "Lenovo and Baidu target Brazil as high-growth market."
[659] "China's Baidu buys control of Brazil's Peixe Urbano in expansion push," *Reuters*, October 9, 2013, http://www.reuters.com/article/2014/10/09/us-peixe-urbano-m-a-baidu-idUSKCN0HY1EN20141009.
[660] Neelima Mahajan-Bansal, "Why Baidu Likes Egypt and Other Such Matters," *Forbes*, April 3, 2013, http://forbesindia.com/blog/chinese-checkers/why-baidu-likes-egypt-and-other-such-matters/; Loretta Chao, "Baidu Brushes Up On its Arabic, Thai," *Wall Street Journal*, September 15, 2011, http://blogs.wsj.com/chinarealtime/2011/09/15/baidu-brushes-up-on-its-arabic-thai/.

director of international communications, did not hide Baidu's ambitions in targeting Egypt. She told the press that Baidu was not only interested in standard fusha Arabic script because it is commonly used from the Maghreb to Mashriq, but also that Egypt is considered a culturally dominant country in the Middle East, with a large amount of cultural production and a large number of trained engineers.[661] The idea is that mastery over this language will help Baidu generate more products and also expand into the wider Arabic world[662] Kuo said, "in these markets, we're dipping our toes in the water and just learning the lay of the land … We're not in a huge hurry. We can be patient."[663] Not that patient. Early in 2014, Baidu was testing its search site in Thailand, Brazil, and Egypt. In July of 2014, Baidu search went live in Brazil as the Brazilian and Chinese governments made a series of agreements including the creation of a "digital city" funded by the Chinese Development Bank.[664]

Meanwhile, Baidu's counterparts are not sitting on the sidelines watching while Baidu gobbles up new markets. In Egypt, the most popular search engine is Google with close to 95% of the search market share; Google also has over 98% market share in Thailand, Brazil and Indonesia. Attempting to expand its market share and counter Baidu's move into Brazil, Google increased its Brazilian workforce by 50% from 350 employees in 2011.[665] This move comes as the Brazilian government is heavily investing

[661] Neelima Mahajan-Bansal, "Growth Engine: China's Search Giant Baidu," *CKGSB Knowledge*, March 12, 2013, http://knowledge.ckgsb.edu.cn/2013/03/12/technology/growth-engine-baidus-global-expansion/
[662] Mahajan-Bansal, "Why Baidu Likes Egypt and Other Such Matters."
[663] Loretta Chao, "Baidu Brushes Up On its Arabic, Thai," *Wall Street Journal*, September 15, 2011, http://blogs.wsj.com/chinarealtime/2011/09/15/baidu-brushes-up-on-its-arabic-thai/.
[664] Angelica Mari, "Chinese search engine Baidu goes live in Brazil," *ZDnet,* July 18, 2014, http://www.zdnet.com/chinese-search-engine-baidu-goes-live-in-brazil-7000031771/.
[665] Samantha Pearson, "Google's plan to tap Brazil's fertile market," *Financial Times*, April 22, 2011, http://www.ft.com/intl/cms/s/2/6fa9386c-6d02-11e0-83fe-00144feab49a.html#axzz2Z9RJdWZz; http://www.chandlernguyen.com/2013/03/search-engine-market-share-mar-2013.html.

in its information sectors to accelerate the country's social and economic development.[666] Yet, despite Google's dominance in these countries, what makes these countries attractive markets for Baidu is that Internet penetration of these countries is still pretty low. Thus, Baidu is targeting populations and markets where US-based digital capital has not yet fully saturated. So far, compared to Baidu's market power in China, Baidu's overseas operations are relatively small and limited which has led it to seek strategic partnerships to leverage its market power. As a start, Baidu is forging a relationship with a French multinational telecommunications company – Orange S.A., formerly France Telecom S.A. – to provide a mobile browser for its Android customers in Africa and the Middle East.[667] Baidu is accelerating its global expansion, aiming to have its products and services used by half of the world's population by 2019.[668]

US-based transnational capital

While Baidu is making an aggressive push inside and outside of China, what about US-based search firms inside China? In 2010, Google announced it was exiting China and moving its servers to Hong Kong over a claimed Chinese cyber attack of over 30 different companies including Google's own servers. And Microsoft and Yahoo! have never had a strong foothold in China and its roughly 632 million Internet users as of 2014 – which accounts for less than half of the country's entire population.[669] Can US-based transnational capital give up the world's largest and fastest growing Internet market? The answer is absolutely not.

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[666] Pearson, "Google's plan to tap Brazil's fertile market."
[667] Daniel Thomas, "Baidu nets France Telecom browser deal," *Financial Times*, January 14, 2013, http://www.ft.com/intl/cms/s/0/07812948-5d92-11e2-ba99-00144feab49a.html#axzz2aeX9kOP3.
[668] "China's Baidu buys control of Brazil's Peixe Urbano in expansion push," *Reuters,* October 9, 2014, http://www.reuters.com/article/2014/10/09/us-peixe-urbano-m-a-baidu-idUSKCN0HY1EN20141009.
[669] Andrea Peterson, "China has almost twice as many Internet users as the U.S. has people," *Washington Post*, January 31, 2014, http://www.washingtonpost.com/blogs/the-switch/wp/2014/01/31/china-has-almost-twice-as-many-internet-users-as-the-u-s-has-people/.

After Google's announcement, a Microsoft spokesman stated that the company had no plans to move out or redirect its operations in China. Microsoft CEO Steve Ballmer wrote in a blog post about the importance of China for its company and stated its position thusly, "we have done business in China for more than 20 years and we intend to stay engaged, which means our business must respect the laws of China."[670] Microsoft remained silent about censorship and the whole hacking incident, not wanting to damage its long-term relationship with China. From Microsoft's perspective, this is a business opportunity with one fewer competitor.

One year after Google relocated its servers to Hong Kong, Microsoft seized the opportunity by teaming up with Baidu. Microsoft's partnership with Baidu was intended to capture English search, which has a 5 percent market share in China, while abandoning the Chinese language search market. To pursue this partnership, Microsoft confirmed that the company would comply with Chinese law and said, "as part of this partnership, Bing will incorporate certain filtering technologies and processes to ensure that we are in compliance with local laws."[671]

So far this strategy has not paid off for Microsoft. The company holds less than one percent of the Chinese search market. Microsoft VP Shen Xiangyang lamented about Bing's lack of market share improvement, saying, "If you can't see users' search questions and choices, if you don't have enough data to work with, then there is no way to make improvements [to the search engine]."[672] Since search engine algorithms rely on

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[670] Sharon Gaudin, "Microsoft to maintain China operations, report says," *Computer World*, March 5, 2010, http://www.computerworld.com/s/article/9166738/Microsoft_to_maintain_China_operations_report_says.
[671] David Pierson and David Sarno, "Bing gets foothold in China market," *Los Angeles Times,* July 6, 2011, http://articles.latimes.com/2011/jul/06/business/la-fi-microsoft-baidu-20110706.
[672] "With Market Share Shrinking, Bing's China Dream is in Serious Danger," *Tech In Asia*, March 6, 2013, http://www.techinasia.com/market-share-shrinking-bings-china-dream-danger/.

user feedback, Bing needs unpaid user labor to improve and refine its search technology. Bing's lack of user traffic has stymied the improvement of its search. In an effort to find unpaid user labor to provide feedback and create content, Microsoft Bing teamed up with Hudong, which is known as China's Wikipedia – with Bing providing search to Hudong and in exchange being given access to a large amount of content to assist it in enhancing and refining Microsoft's search engine technologies.[673] Whether this will give Microsoft a competitive edge is questionable; however, Microsoft is still expanding and looking for alternative routes into the Chinese market.

As former Microsoft CEO Steve Ballmer said, the company has been operating for years and search is only one of many pieces of its business. As of 2013, Microsoft had a workforce of 4,000 in China, but the company was preparing to radically expand its operations, with plans to hire 1,000 additional employees in China and increase its R&D by 15 percent.[674] One of the reasons for Microsoft to significantly invest in China in terms of resources, workforce, technology and partnerships is because it is betting on its cloud computing platform *Azure* to help it expand in China, Japan, and Australia. Microsoft is partnering with 21Vianet, one of the largest Internet service providers in China, which operates and sells the Windows Azure service in China.[675] Microsoft's move to the cloud isn't without Chinese and US government involvement. China's party state has encouraged the development of cloud computing as a strategic industry and is

[673] Jamillah Knowles, "China's Wikipedia, Hudong teams up with Bing to boost search technologies," *TNW*, June 5, 2012, http://thenextweb.com/asia/2012/06/05/chinas-wikipedia-hudong-teams-up-with-bing-to-boost-search-technologies/.
[674] John Foley, "Microsoft stages nebulous Chinese comeback," *Fortune*, May 29, 2013, http://tech.fortune.cnn.com/2013/05/29/microsoft-china-piracy;
Michael Kan, "Microsoft plans large expansion in China to push cloud services," *PC World*, September 5, 2012, http://www.pcworld.com/article/261947/microsoft_plans_large_expansion_in_china_to_push_cloud_services.html.
[675] Foley, "Microsoft stages nebulous Chinese comeback."

formulating a national economic policy. In 2010, to push cloud computing, the National Development and Reform Commission (NDRC) and Ministry of Industry and Information Technology (MIIT) designated five pilot cities for cloud computing development.[676] In 2011, during the 22nd US-China Joint Commission on Commerce and Trade, cloud computing was on the agenda for bilateral exchanges.[677] With Chinese- and US governments' blessings, the Shanghai Municipal Government became the first in the region to deploy Microsoft's cloud services.[678]

Microsoft has also launched its Chinese Microsoft store online, partnering with Alibaba Group's TMall, a shopping site that handles goods for more than 50,000 merchants, including major brands like Dell, Gap, Lenovo, and Samsung. Microsoft's game console Xbox One also began to sell in the Chinese market, where earlier game consoles had been banned by the Chinese government for 14 years. Despite Microsoft's search engine setback, there is little sign that the company will retreat from the potentially lucrative and expansive Chinese information market.

Yahoo! on the other hand has been downsizing its Chinese operations as its business in general has seriously suffered in the US. Yet, Yahoo! still has some presence in China through partial ownership of Alibaba rather than its own services. Yahoo! first entered into the Chinese market in the late 1990s under the domain name of cn.yahoo.com with a joint venture with Chinese computer-maker *Founder*. In 2005, as a way to gain access into the Chinese Internet market, Yahoo! acquired a 40 percent stake

[676] Wen Liu, "Cloud computing will help expand US-China Ties," *Context China*, July 13, 2013, http://contextchina.com/2013/06/cloud-computing-will-help-expand-u-s-china-ties-gary-locke/.
[677] "22nd U.S.-China joint commission on commerce and trade fact sheet," *Embassy of the United States Beijing*, November 21, 2011, http://beijing.usembassy-china.org.cn/112111jcct.html.
[678] Jonathan Brandon, "Microsoft Azure aims for June launch in China," *Business Cloud News,* May 23, 2013, http://www.businesscloudnews.com/2013/05/23/microsoft-azure-aims-for-june-launch-in-china/.

in Chinese e-commerce firm Alibaba.com and merged its China-based subsidiaries into Alibaba – including the Yahoo! Chinese search engine. This gave Yahoo! 35 percent voting rights in Alibaba.com and in return, Alibaba obtained the exclusive right to use and grow the Yahoo! brand in China.[679] However, today, as Yahoo!'s business is dwindling in both China and the US, the company's earnings have relied heavily on Alibaba's soaring revenues.

In 2011, Alibaba bought back half of Yahoo!'s 40 percent stake for US$7.6 billion, in a move widely seen as preparation for an initial public offering. After selling back the stocks to Alibaba, Yahoo!'s stake dropped to 20% ownership of Alibaba. Since then, Yahoo! China has closed both its email and music search service as the company is trying to revive its sagging business with serious acquisition sprees using the cash gained from selling its Alibaba stock and from Alibaba's IPO. Yahoo!, who was one of the earliest email providers in China, ended its email service in 2013 and asked users to transfer their accounts to AliCloud, a core business of Alibaba.[680] By closing its Yahoo! Mail and Music services, the company leaves only its Yahoo! Web portal in China. Yahoo!'s deal with Alibaba stated that the company had the right to buy back half of that stake from Yahoo! when Alibaba had its IPO. After Alibaba's IPO, Yahoo!'s stock price actually went down as investors who had acquired a stake in Alibaba via the Yahoo! proxy, are now moving to purchase Alibaba stock directly.[681] Given its declining search

[679] "Yahoo to invest US$1 billion in Chinese e-commerce *site,*" *New York Times,* August 11, 2005, http://www.nytimes.com/2005/08/11/business/worldbusiness/11iht-web.0811yahoo.html?_r=0.
[680] Xie Yu, "No joy for Yahoo China as e-mail service to close," *China Daily*, April 4, 2013, http://europe.chinadaily.com.cn/business/2013-04/19/content_16421474.htm.
[681] Brian Womack, "Yahoo Valued at Less Than Asian Assets After Alibaba IPO," *Bloomberg*, September 19, 2014, http://www.bloomberg.com/news/2014-09-19/yahoo-valued-at-less-than-asian-assets-after-alibaba-ipo.html.

and display businesses and shrinking revenue, at this point, Yahoo! has little capacity for long-term survival let alone expansion in China.

How about search giant Google? Google also entered the Chinese market in 2005 and was able to gain over 35% market share of search service by number of users by the time it moved operations to Hong Kong. Now it only has a little over 1% of search market share in China. Google's flagging business in China has often been explained by mainstream analysts within the context of Google's withdrawal from the Mainland Chinese market in 2010, attributing the move purely to the company's extraordinary moral high ground in refusing to compromise with the Chinese government's censorship. Microsoft and Yahoo! did not abandon the Chinese market. Did Google really give up the world's largest growth market on behalf of its self-claimed business principle "do no evil"? The answer is no.

In fact, Google never actually left China. Google itself dismisses the popular claim that the company departed from China; in 2012, Daniel Alegre, Google's president of the company's Asia-Pacific operations, stated:

> We never left China, and we continue to believe in the market … It's a very vibrant Internet market. We have some of the best employees at Google and we continue to grow not only our revenue but also our headcount in the country.[682]

Google was praised for its "idealistic" act of leaving China to protest and evade Chinese government censorship, and presented itself as the corporate moral vanguard; however, as Alegre confirmed, the company has continued its operations in China. It is true that Google started to deliver its main search service through servers in Hong Kong instead of from Mainland China, which has contributed to Google's radically shrinking search

[682] Susan Li and Brian Womack, "Google China Business Grows, 'Continues to Thrive,' Alegre Says," *Bloomberg*, January 23, 2014**,** http://www.bloomberg.com/news/2012-01-24/google-china-business-grows-continues-to-thrive-alegre-says.html.

engine business in China.[683] However, it is a well-known fact that Google has kept its R&D operations, Google offices and its ads business in Beijing and Shanghai; in addition, it has never ceased its other business ventures – like music, maps, online shopping and mobile ads platform AdMob services. In 2011, John Liu, Google's vice-president in China also refuted the popular claim, and restated, "it [Google] has continued to provide music and translation services all through the past year… Our related business has also had significant progress."[684] This statement is corroborated by the *Wall Street Journal*, which reported that Google still had more than 500 employees in China as of January, 2013, including more than 300 engineers.[685] This represented only a decrease, not a full-fledged flight from China, as Google had about 700 employees in 2009, according to a former Google executive in China.[686]

As a matter of fact, after "leaving" China in March 2010, *Reuters* reported that Google simply shifted its business in China, targeting display advertising, particularly centered around China's growing export firms who need to access global consumers and mobile business.[687] Given China's heavy reliance on exports, as much as Google needs the growing Chinese markets, Chinese firms also need Google – which reaches 90% of Internet users worldwide via its ads network. Considering these mutual interests, it is no surprise that Google re-focused on rapidly-growing Chinese exporters who were eager to

[683] "A new approach to China: an update," *Google Blog*, March 22, 2010, http://googleblog.blogspot.com/2010/03/new-approach-to-china-update.html.
[684] Yang Yang, "Google in China 2.0:New Strategy Avoids Censorship Showdown," *World Crunch*, September 30, 2011, http://worldcrunch.com/google-china-20-new-strategy-avoids-censorship-showdown/tech-science/google-in-china-2.0-new-strategy-avoids-censorship-showdown/c4s3859/.
[685] Amir Efrati and Loretta Chao, "Google Softens Tone on China," *Wall Street Journal,* January 12, 2013, http://online.wsj.com/article/SB10001424052970203436904577155003097277514.html.
[686] Ibid.
[687] Melanie Lee, "Analysis: A year after China retreat, Google plots new growth," *Reuters*, January 13, 2011, http://www.reuters.com/article/2011/01/13/us-google-china-idUSTRE70C1X820110113.

reach out to overseas customers through global search sites like Google.[688] In *China Daily*, Analysis International, a market research firm, noted that Google's Chinese revenues center around exports as it remains a a primary avenue for Chinese domestic advertisers doing overseas marketing.[689]

By early 2012, Google started to hire more engineers, salespeople and product managers in China to gear up its mobile business.[690] And the company also rolled out its advertising platform DoubleClick Ad Exchange service in China to attract local Chinese businesses. Google's DoubleClick has existed in China before, but added a real time Ad exchange marketplace – part of Google's broader Ads Display Network.[691] On the advertiser side of the equation, Google obtained Hylink Advertising, Taobao.com, Yoyi, and Aegis Group, while on the publisher side, Sina.com, Sohu.com, CNTV, and Ifeng.com have also joined the service.[692]

As of 2013, in China's growing mobile market, Google's Android OS is on approximately 84% percent of Chinese smartphones**,** while iOS has 12.8% percent of the market.[693] China had over 270 million Android users by the end of 2013 – 30% of the total global mobile market.[694] By running Android OS on many different mobile phones, Google plans to control the smartphone market by driving mobile traffic to Google services. While Android is an open source platform, it is built around Google services

[688] Matt McGee, "Google's New China Plan: Target Display Advertisers, Report Says," *Search Engine Land*, January 13, 2012, http://searchengineland.com/googles-new-china-plan-target-display-advertisers-report-says-61219.
[689] Chen Limin, "Google aims to boost ad business," *China Daily*, April 18, 2013, http://www.chinadaily.com.cn/cndy/2013-04/18/content_16417189.htm.
[690] Efrati and Chao, "Google Softens Tone on China."
[691] "Google Launches Advertising Trading Platform In China," *China Tech News*, April 13, 2012, http://www.chinatechnews.com/2012/04/13/16220-google-launches-advertising-trading-platform-in-china
[692] "Google Launches Advertising Trading Platform In China."
[693] Apple and Nokia China Challenge, March 31, 2013, *Seeking Alpha*, http://seekingalpha.com/article/1310221-apple-and-nokias-china-challenges
[694] Asha Jhina, "China Has Largest Number of Android Users," *International Business Times*, December 4, 2013, http://www.ibtimes.co.in/china-has-largest-number-of-android-users-527280.

like Gmail, Chrome Internet browser and Android's App Store – now called Google Play. All new Android code has to go through Google's code review process, and Google also tightly controls the Android trademark so that the Android name is only used with Google's approval. [695]

Given that the majority of cellphones run on Android OS, Google possesses a competitive advantage in mobile in-app display advertising in China. AdMob's mobile display ads are embedded in more than 300,000 phone apps,[696] and have more than 10,000 registered developers in China.[697] App developers and corporations alike – including BMW and Shanghai General Motors – are marketing to Chinese smartphone users utilizing Google's AdMob, which reaches across smartphone platforms.[698] According to China-based market research firm iResearch, Google generated 45 percent of all mobile display ads, compared to just 9 percent for Domob, its closest Chinese competitor.[699] In comparison, in the US market, more revenue is generated in mobile search advertising than mobile display, both of which are dominated by Google today.[700] Gartner predicts that mobile display ad spending will grow and take over mobile search in China.[701]

Google has never given up its efforts to gain market share in the world's largest Internet market. The company also quietly turned off its much-publicized Chinese anti-

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[695] Fraser Sherman, "What Is the Purpose of Google Android's Open Market Strategy?" *Chron*, http://smallbusiness.chron.com/purpose-google-androids-open-market-strategy-39280.html.
[696] Kunur Patel, "Google Takes Mobile Ads to 1 Million More Advertisers," *Advertising Age,* June 7, 2011, http://adage.com/article/digital/google-takes-mobile-ads-1-million-advertisers/235211/.
[697] Mark Lee, "Google Finally Leads in China -- in App Ad Sales," *Bloomberg,* August 21, 2012, http://www.bloomberg.com/news/2012-08-22/google-finally-leads-in-china-in-app-ad-sales.html.
[698] Ibid.
[699] Greg Sterling, "Google Leads Chinese In-App Mobile Display Ad Market," *Marketing Land*, August 22, 2012, http://marketingland.com/google-leads-chinese-in-app-mobile-display-ad-market-19434.
[700] Ibid.
[701] "Gartner Says Worldwide Mobile Advertising Revenue to Reach $11.4 Billion in 2013," *Gartner,* January 17, 2013, http://www.gartner.com/newsroom/id/2306215.

censorship service in China after only six months. The service's key feature was the notification of users when they typed a censored word, and giving them a choice to rewrite the keywords or redirect them to a help page explaining how not to be cut off from the Internet by Chinese authorities.[702] Yet, Google continues to criticize the Chinese government's censorship in public as if the company had left China.

However, Google's persistent presence does not mean that Google is having a smooth ride. US digital capital is struggling and has bumpy roads ahead. Unlike in the rest of the world, Google has not thus far established a dominant position in China. Not only has Google's general search market share in China been shrinking, Google shut down its shopping and music services as it was not able to compete with Alibaba's retail search service Etao and Baidu music – which has a licensing agreement with One-Stop China, a joint venture with Universal, Warner and Sony BMG.[703] While Google has boasted that the company has more than 1 billion devices with Android OS worldwide (as of late 2013), tens of millions of those smartphones in China use only Android Open Source Platform, which does not connect to Google services.[704] The major Chinese Internet firms like Baidu, Alibaba and Tencent have all forked (modified) Android OS and replaced Google services with their own search and other services.

The 2010 dispute between Google and Alibaba offers a glimpse of Google's need to control every inch of the Android market space in China. Google aggressively blocked Acer, a Taiwanese electronics company, from working with Alibaba to build a smartphone running Alibaba's mobile OS by enforcing the Open Handset Alliance

[702] Liat Clark, "Google backtracks on Chinese anti-censorship feature," *Wired*, January 4, 2013, http://www.wired.co.uk/news/archive/2013-01/04/google-china-anti-censorship-fail.
[703] Jon Russell, "Radio silence: Google unplugs its China-only music service," *TNW*, September 12, 2012, http://thenextWeb.com/google/2012/09/21/googles-china-based-music-service-closing-october-19/.
[704] Jhina, "China Has Largest Number of Android Users."

agreement that Acer had signed. Under the Open Handset Alliance (OHA) – funded since 2007 by Google – Acer was required to run versions of Android compatible with the Android ecosystem, and Google insisted that Alibaba's *Alyun* Android-forked mobile OS was not. In the end, under Google's threat, Acer retracted its agreement with Alibaba – which instead launched the K-Touch handset manufactured by handset maker Tianyu (not a member of the OHA) running Alyun OS with its own email, app store, etc.[705] In 2013, Alibaba made another mobile push to expand the reach of its OS by rebranding Alyun as Alibaba Mobile Operating System and subsidizing mobile handsets running Alibaba's mobile OS 1 yuan per month, and sharing revenues from a fund of $161.49 million with mobile app developers to spur them to build apps for its OS.[706] Despite Google's offensive tactics, Alibaba, whose revenues exceeded 2 percent of China's gross domestic product in 2012,[707] did not flinch; rather it went on to bolster its mobile OS AMOS by making deals with five lower-end Chinese smartphone makers, including G'Five and Zopo, to sell AMOS-installed devices.[708] The fastest growing Chinese smart phone maker Xiaomi, who hired Google's former executive Hugo Barra as vice-president of international operations, is also running a forked Android OS but without Google Apps and services using it own services. Xiaomi is solidifying its hold as the third largest mobile maker, breathing down Samsung's and Apple's necks.

Google is facing stiff competition in China; however, the company will not or cannot afford to give up on the world's largest Internet market. The company will

[705] "Google Trying To Impede Alibaba's Progress on Mobile," *China Internet Watch*, September 17, 2012, http://www.chinainternetwatch.com/1612/google-aliyun/.
[706] "Alibaba makes major mobile push with 1 billion yuan fund," *Reuters,* April 15, 2013, http://www.reuters.com/article/2013/04/15/us-alibaba-mobile-idUSBRE93E0EA20130415.
[707] Bruce Einhorn, "China's Alibaba Makes Its Move Against Google's Android," *Bloomberg Business Week,* May 16, 2013, http://www.businessweek.com/articles/2013-05-16/chinas-alibaba-makes-its-move-against-googles-android.
[708] Ibid.

continue to deploy diverse tactics to tackle the Chinese market, and is not above eliciting help from the US government. Daniel Alegre, Google's top executive in Asia, in an interview with the *Wall Street Journal* in 2012, alluded to Google's affirmed new strategy by saying "Google is aiming to capitalize on its fast-growing Android operating system for mobile devices, online-advertising and product-search services to grow in China." One goal, he said, was to introduce Android Market (now known as Google Play), which wasn't available in China as of January, 2012, in order to offer mobile applications to users of Android-powered smartphones and tablets.[709] How far will this strategy work and be able to change market dynamics in Google's favor?

There are hundreds of local providers that already offer paid and free apps in China.[710] Unlike in the US apps market, where Apple and Android dominate, the Chinese app market is more fragmented. There are about 20 major players, with Baidu, Qihoo 360, and Tencent leading the way – distributing about 86% of mobile apps.[711] In addition, Google's domestic competitor Apple is showing the importance of the expanding Chinese market by being willing to work within Chinese legal requirement concerning privacy in launching a localized Chinese app store, and storing personal data in China Telecom servers. In May of 2013, Amazon jumped ahead of Google and began its mobile app business in China, and launched its Android App store, which offers both free and paid apps – which is different from Google Play, which currently offers only free apps in China. Given this, whether Google can carve out market share in China remains open.

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[709] Amir Efrati, and Loretta Chao, "Google Softens Tone on China," *Wall Street Journal,* January 12, 2012, http://online.wsj.com/article/SB10001424052970203436904577155003097277514.html

[710] Masanari Arai, "Explaining China's mobile app ecosystem: the potential, players, and pain points," *Venture Beat,* November 9, 2013, http://venturebeat.com/2013/11/09/how-to-understand-chinas-mobile-app-ecosystem-the-potential-the-players-and-pain-points/.

[711] Rocky Fu, "China Mobile App Distribution Channels Market Share," *China Internet Watch*, July 3, 2014, http://www.chinainternetwatch.com/7815/china-mobile-app-distribution/#ixzz3ESopCfBr.

This uncertainty possibly helped to motivate Eric Schmidt to visit China. In 2013, he made a public appearance in China on his way from a trip to North Korea as a mystery speaker at "Geek Park" – the Chinese version of TED talks – to target product managers, developers and investors. At the gathering of 3000 "geeks," he spoke about Google's Android operating system, and attempted to persuade local developers to write applications for the platform,[712] enticing them by talking about ways to monetize apps. Schmidt told the crowd, "don't just settle for the China market. Go after the world market." He sounded more like a cheerleader than a moralist.

Giving up on China is not an option for Google. Because not only is China the largest Internet market and growing economic zone, but also Chinese Internet firms are attempting to establish their market positions in other emerging markets across Asia, Africa, and Latin America, where Google is trying to maintain and expand its dominance. This is a serious threat to Google's future growth, so Google has to figure out ways to interact with them. Despite China's Internet market being fueled by transnational capital, the PRC's policies enable and provide maneuverability for domestic digital capital to compete.

Europe: Old Challenge

Countering Google Search Engine

US-based transnational capital is confronting serious obstacles in China's search engine market. Google in particular also faces vicissitudes in Europe despite its overwhelming domination of Europe's search engine market. Since World War II, Europe has had a long history of struggle to challenge US dominance in the information

[712] Michael Del Castillo, "Google's Eric Schmidt tells Chinese innovators to win the world," *UpStart Business Journal*, February 21, 2013, http://upstart.bizjournals.com/news/technology/2013/02/21/eric-schmidt-at-geek-park-china.html?page=all.

sphere, but it has not been able to build a globally competitive information economy or even autonomous information systems. In fact, Europe's dependence on US information systems has benefited both the US and US capital. Google's global dominance has again provoked Europe's anxiety over losing control over strategic emerging information sectors to the US.

The full story of European countries' failed attempts both individually and within the framework of the EU, to establish a thriving, multifaceted information industry independent of and competitive with the US, has never been told. It started in the immediate postwar period and extended from digital computer to satellite to data communication network to today's Internet system and application; competitive tensions pertaining to search service must be placed in this larger context.

In 2005, during the French-German ministerial conference, then-French President Jacques Chirac warned about the danger of losing the "power of tomorrow," and stated that, "We must take the offensive and muster a massive effort."[713] Chirac was responding specifically to US dominance in the information industry, and in particular to Google. At the conference, Chirac, alongside then German Chancellor Gerhard Schröder, endorsed a proposal to build a Franco-German Internet search engine called Quaero (Latin for "I Seek"). Later that month, following the conference, Mr. Chirac self-servingly declared, "culture is not merchandise and cannot be left to blind market forces. We must staunchly defend the world's cultural diversity against the looming threat of uniformity. Our power is at stake."[714]

[713] "Attack of the Eurogoogle," *Economist*, 2006, March 9, http://www.economist.com/node/5571496.
[714] Ibid.

With urgency, France and Germany initially agreed to commit around $1.3 billion to $2.6 billion toward the project over five years in order to build an alternative search engine.[715] European-based technology companies like Thomson, France Télécom, Siemens and Deutsche Telekom also contributed to the Franco-German project.[716] Yet, this effort was far from successful in mobilizing European countries to counterbalance Google; rather, it ended rather ignobly when Germany dropped out of the project in 2007.

The media reported that the main reason for Germany opting out of the Franco-German project was due to a disagreement regarding the format of the search engine – with German engineers pursuing a text-based search engine and French engineers favoring a multimedia search engine. Yet, this offers merely part of the story. The German government under Chancellor Angela Merkel – from the Christian Democratic Union, which had defeated Gerhard Schröder's party – shifted Germany's position, considering Quaero to be not worth the $1.3 – $2.6 billion investment. Angela Merkel had never committed to the project in public.[717] According to the *New York Times*, Germany's retreat from the project was because many German participants in the project did not want to be associated with an anti-Google project as they considered Google's technology to be beneficial.[718] Rooted in historical legacy, France was overtly anxious over US dominance of new information spheres and the enrichment of US digital capital at the expense of French, while the German government still aspired to ally itself with the US to be part of global digital capitalism.

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[715] Kevin O'Brien and Thomas Crampton, "Germany quits search engine project - Business - International Herald Tribune," *New York Times*, January 2, 2007, http://www.nytimes.com/2007/01/02/business/worldbusiness/02iht-search.4081237.html?_r=1&.
[716] Ibid.
[717] Ibid.
[718] Ibid.

Soon after Germany pulled out of the Franco-German project in 2007, the German Federal Ministry of Economics and Technology (BMWi) launched the search research project *Theseus* which was first presented at the German Chancellor's IT summit established by BMWi in December 2006.[719] Theseus focuses in developing new technologies for Internet services based on semantic Web technologies, which links information together via metadata through partnerships with 60 academic institutions and private industry. Hendrik Luchtmeier, a spokesman for BMWi, distinguished Theseus from Quaero, stating that Theseus would not develop a search engine per se, but would support companies and organizations working in areas including search-technologies and advanced communication networks.[720] By aiding private IT companies and the public institutions that support them, the German government intended to build its own information sector that would have capacity to compete in and be an integral part of the global information market. The Theseus program, one of Germany's biggest research projects, is a way to produce marketable products and services.[721] Economics Minister Michael Glos openly posited Theseus's economic agenda, stating that, "… New forms of acquiring, searching for and evaluating Internet-based information are of strategic importance for the German government … With Theseus we want to improve Germany and Europe's ability to compete and reach a top position in IT and communications technology."[722] The program received a 100 million euro subsidy from BMWi – with approval from the European Union –with another 100 million euro planned contribution

[719] "THESEUS Joint Research," *German Institutes of Technology*, 2011, http://www.tu9.de/research/2168.php.
[720] Mathis Winker, "Germany Pulls Away From Quaero Search-Engine Project." *DW*, December 21, 2006, http://www.dw.de/germany-pulls-away-from-quaero-search-engine-project/a-2287489.
[721] "THESEUS Joint Research," 2011, http://www.joint-research.org/en/begleitforschung/tagebuch/.
[722] "Germany to Fund Rival to Google Search Engine," *Deutsche Welle (DW),* July 20, 2007, http://www.dw.de/germany-to-fund-rival-to-google-search-engine/a-2698176.

by participating partners from both industry and research institutions.[723] In the first phase, the German government funded major German multinational IT companies – Siemens, SAP, Empolis and Deutsche Thomson – and planned to also aid medium- and small sized companies.[724]

Mainstream media reported that the reason for the split between France and Germany was because of differences in technical approaches to search technology – Germany wanted to build Theseus based on the semantic Web, while France was focused on multimedia search technologies. However, the real agenda for the German government all along seems to have been to build a German centered IT sector – rather than a European – to insert power into and help shape a global digital capitalism in which Germany would have a growing stake.

Quaero and Theseus are not the only European projects. Pharos (**P**latform for searc**H**ing of **A**udiovisual **R**esources across **O**nline **S**paces) is another EU search engine project similar to French search engine Quaero. Pharos also focuses on multimedia and audiovisual search technology. A smaller project was led by the Norwegian search company Fast Search & Transfer ASA (FAST) and financed by both private and public funds. The European Union's Information Society Technologies Programme – with thirteen partners from 9 countries (Austria, Finland, France, Germany, Italy, Norway, Spain, Switzerland and the UK) and including France Telecom, L3S Research Centre at the University of Hannover, Fraunhofer Institute for Digital Media Technology – funded

[723] Federal Ministry of Economics and Technology, "The THESEUS research program: new technology for the Internet of Services," http://www.bmwi.de/English/Redaktion/Pdf/theseus-research-program,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf.
[724] Dunca Riley, "EU Google Competitor Gets $165 million Kick Start," *Tech Crunch*, July 20m 2007, http://techcrunch.com/2007/07/20/eu-google-competitor-gets-165million-cash-injection/.

FAST with 8.5 million Euro.[725] The private company running the Pharos project shut down in 2009, shortly after Microsoft's 2008 acquisition of FAST – now known as FAST, a Microsoft Subsidiary.

Countering Google Book Search in Europe

Along with the announcement of building European search engine Quaero in April 2005, then-President Chirac and the Premiers of Germany, Spain, Italy, Poland and Hungary, also sent a letter to the President of the European Commission and recommended that the EU create a digital European library to make Europe's cultural heritage accessible for all. This was a state-centered response to Google book search, which had embarked on a project to digitize books, maps, newspapers, paintings, photographs and other cultural artifacts from around the world. Jean-Noël Jeanneney, who was the head of Bibliothèque nationale de France (BnF) from 2002 – 2007, called out Google's book project as a bid for supremacy based on privileging American culture and privatizing public resources. *Europeana* was the answer to this supposed attack on French culture.

Europeana – a European Commission initiative – aggregates resources from 48 European national libraries, museums and archives. At the same time, the BnF was also part of a larger initiative of the European Commission's five-year economic strategy called *European Information Society 2010* (i2010)[726] meant to build a European-based

[725] Estelle Dumut, "Germany bows out of Euro 'Google killer," *ZDnet,* January 8, 2008. Thirteen partners include Engineering Ingegneria Informatica, France Telecom, L3S Research Centre at the University of Hannover, Fraunhofer Institute for Digital Media Technology, Ecole Polytechnique Federale de Lausanne, Knowledge Media Institute of The Open University, Fundacio Barcelona Media Universitat Pompeu Fabra, Technical Research Centre of Finland, Circom Regional, Metaware, Web Model, Sail Labs Technology and Fast.

[726] European Commission, "Commission launches five-year strategy to boost the digital economy," European Union Press Release, June 1, 2005, http://europa.eu/rapid/press-release_IP-05-643_en.htm?locale=en.

digital economy. The EU launched this initiative in 2005 in order to foster economic growth by prioritizing information sectors within a single European information market, and to provide EU investment in research on information-related business.[727] Given this context, the digital library *Europeana* is not only on EU's cultural agenda but also on its political and economic agendas. The chosen vehicle was public-private partnerships (PPP) in digitizing cultural materials as a step toward the building of an EU-based information economy. Following in the footsteps of US digital capital, the EU moved into the cultural realm, which had not been fully captured by capital and made into a marketplace. Digitization was the first step in this process.

The EU has made a concerted effort to build its regional information economy by recruiting cultural institutions – though it has been done unevenly across European states; yet, Google has also already seized upon some of Europe's eagerness to generate its own cultural materials, as well as to build its own information-based cultural industry. Digitization and organizing digitized information are expensive, onerous processes that require enormous financing, extensive technical expertise and a developed infrastructure. However, so far, few institutions in Europe can afford the cost and/or have the technical capacity to compete and outpace Google – especially amid the current economic crisis and widespread austerity policies. The EU has promoted digitization of cultural materials and contributed them to *Europeana*; but it made clear it would not pay for the actual digitization work, which was left to individual member nations and institutions. Given this, many European cultural institutions such as national and university libraries in Italy, Austria, Spain, Ireland and Britain have allied instead with Google, which is willing to digitize their collections in order to speed up the digitization process. Google's offer is

[727] Ibid.

enticing for many European institutions because it entails the company digitizing institutions' materials free of charge in exchange for adding the digitized materials into Google book search as well as *Europeana*.

France was the exception among European countries in defying any alliance with Google and challenging US dominance of European information sectors. In 2009, conservative then-President Nicolas Sarkozy vowed to spend $1.08 billion as part of an economic stimulus package toward digitization of the content of museums, libraries and cinematographic heritage organizations. [728] He warned that he would not allow Google "to carry out a massive literary land grab on French and other European literature."[729] Sarkozy stated, "we won't let ourselves be stripped of our heritage to the benefit of a big company, no matter how friendly, big or American it is"[730]… "We are not going to be deprived of what generations and generations have produced in the French language just because we weren't capable of funding our own digitization project."[731]

The plan for France was to use existing digital collections within the Gallica project in order to challenge Google. How would France pursue this? Sarkozy emphasized the importance of public-private partnerships in digitizing his nation's cultural works. France aimed to build up Gallica's collections by partnering with French publishers and private

[728] Roland Parry, "France accepts Google role in book scanning," *AFP*, January 20, 2010, https://web.archive.org/web/20130426074722/http://www.google.com/hostednews/afp/article/ALeqM5gZPe-DbjkDNnuBOdOLWMQIt5vHSw.
[729] Henry Samuel, "Nicolas Sarkozy fights Google over classic books," *Telegraph,* December 14, 2009, http://www.telegraph.co.uk/technology/google/6811462/Sarkozy-fights-Google-over-classic-books.html .
[730] Sophie Hardach, "France's Sarkozy takes on Google in books dispute," *Globe & Mail*, 2012, August 23, 2012, http://www.theglobeandmail.com/technology/frances-sarkozy-takes-on-google-in-books-dispute/article4295693/?service=mobile.
[731] Henry Samuel, "Nicolas Sarkozy fights Google over classic books," *Telegraph*, December 14, 2009, http://www.telegraph.co.uk/technology/google/6811462/Sarkozy-fights-Google-over-classic-books.html.

companies.[732] This public-private partnership was a way to open up public resources to private companies – a step toward exploitative privatization of public resources. France's overarching concern was eroding US dominance in the information market and protecting France's cultural heritage for French commercial interests – not to attack capitalist development of information

In December 2009, after France had said no to Google and decided to pursue its own digitization project, French Minister of Culture Frédéric Mitterrand and Google executive David Drummond met in Paris to discuss France's concerns. In a *New York Times* interview, Bruno Racine, President of the *Bibliothèque Nationale de France* (BnF) (2007 - present), emphasized the "necessity of a partnership with the private sector in order to secure the capital needed for vast digitization projects."[733] Racine's position shifted from that of his predecessor, Jean-Noël Jeanneney, who had been a fierce opponent of the Google Book search project to digitize the world's books. France now left the door open for Google to be part of the public and private partnership. According to a cable made public by WikiLeaks, the reason Mitterrand altered his position was because it would take $1.5 billion and technical expertise to digitize 14 million works in the BnF, and Google agreed to create jobs in France and open a scanning facility in Lyon as part of its digitization agreement with the University of Lyon.[734]

By January 2010, France had agreed to work with Google on the digitization of books at the BnF; but they insisted that they would not allow Google to have legal control

[732] Lance Whiteny, "France planning Google Books rival," *CNET*, January 13, 2010, http://www.cnet.com/news/france-planning-google-books-rival/.
[733] Scott Sayare, "France to Digitize Its Own Literary Works," *New York Times*, December 14, 2009, http://www.nytimes.com/2009/12/15/world/europe/15france.html.
[734] "Googlisation of France," Unclassified US Cable, US Embassy, Paris, France, December 18, 2009, WikiLeaks Public Library of US Diplomacy, http://www.wikileaks.org/plusd/cables/09PARIS1729_a.html.

over digitized materials. Google was demanding exclusive control over the works for a period of 20 – 25 years. Mitterrand was quoted in an interview in *Le Monde* as saying,

> Google came to Europe with the attitude of a conqueror, and many opened the door to it by signing deals which I find unacceptable, (that) are based on excessive confidentiality, impossible exclusivity, and a casual, even one-sided approach to copyright … We will propose to them ... to exchange files without confidentiality or exclusivity, in total transparency and with total respect for copyright.[735]

France aspired to control its own information and insisted that Google drop its exclusivity clauses in the agreement.[736] Yet, before the French government's official partnership announcement with Google, the Bibliothèque Municipale in Lyon had forged a deal with Google to digitize its entire book collection and to give Google the rights to the works for 25 years. This became the first library in France to partner with Google to digitize books.

France had led Europe in voicing its opposition to US control over information, but there are signs that France is gradually having its information sphere taken over by US-based transnational capital and marching toward privatization of their own cultural materials. In 2013, the French Ministry of Culture announced a public-private partnership between the *Bibliothèque nationale de France* (BnF) and US-based *ProQuest* to digitize over 70,000 books, 200,000 sound recordings and other documents in the public domain. Within this partnership, ProQuest will retain 10-year exclusive agreements allowing the company to host and commercialize the digitized collections.[737] In fact, this ProQuest move is alarming to Google which has been eyeing rich European culture to absorb into Google's profit-making realm. Toward this goal, Google launched its Cultural Institute

[735] Jenny Barchfield, "France plans its own rival to Google Books," *Boston.com,* January 12, 2010, http://www.boston.com/business/technology/articles/2010/01/12/france_plans_its_own_rival_to_google_books/.
[736] Ben Hall, "Paris threatens Google over book-scanning," *Financial Times,* January 13, 2010, http://www.ft.com/intl/cms/s/0/f01e209a-ffe2-11de-ad8c-00144feabdc0.html#axzz2a03oRyga.
[737] "Dirty Deeds: French National Library Privatizes Public Domain," *Tech Dirt*, February 19, 2013, http://www.techdirt.com/articles/20130212/17065121955/dirty-deeds-french-national-library-privatizes-public-domain-part-2.shtml.

under the guise of digitization of world culture for global access; yet it aims to digitize cultural materials from museums and archives around the world and gobble them up into its business of information.[738] The Google Cultural Institute has already opened up headquarters in Paris to preemptively occupy the untapped cultural information sphere. Can France continue to resist US-led digital capital in Europe and build its own information-based economy as a counterweight to the US? Will France be able to push back against Google's massive global scale of corporate takeovers of culture that have become such lucrative resources? At the same time, can US capital pass on such a massive reservoir of culture that could be a new source of profit making?

Battlefield

Google's relentless advances into Europe's cultural and information spheres have been stirring Europe's deep-seated anxiety over US information dominance. But ironically, the battle is less between European- and US-based capital, then between rivals, much of US based Internet capital looking for competitive advantage extraterritorially by making use of European legal authority in the jurisdiction of the EU. As a result, Europe has turned into a major battlefield for US inter-capitalist rivalries.

In 2010, the European Commission (EC) – the EU's executive body and the 27-nation bloc's antitrust authority – officially opened its antitrust case against Google on whether the company was penalizing its competitors in search ranking. This antitrust case was initiated by four companies based in Europe – French legal search engine *Ejustice.fr*, *1PlusV*, the parent company of eJustice.fr, UK-based *Foundem* and Microsoft-owned *Ciao!* based in Germany. These four companies filed official complaints with the EU,

[738] Dan Schiller and ShinJoung Yeo, "Powered by Google: Widening Access and Tightening Corporate Control," *Leonardo Electronic Almanac* 20, no. 1(2014), http://www.leoalmanac.org/vol-20-no-1-red-art/.

stating that Google's search algorithm had had significant negative consequences for their Web site traffic. On the surface, it seemed that these cases had been brought by European companies protesting against Google's European market dominance. In point of fact though, as Nicolas Petit, a professor of competition law at the University of Liege in Belgium pointed out, "Everyone understands here in Brussels that it's Microsoft versus Google."[739] Microsoft is behind numerous antitrust complaints to the EU against Google, in order to challenge Google for giving preference to its own services and advertisers in search rankings. Microsoft has been using several lobbying groups to urge the Commission to probe Google's business practices. The *Financial Times* uncovered the fact that *Foundem* was supported by the Initiative for a Competitive Online Marketplace (ICOM), a Microsoft-backed lobbying group, to turn their charge against Google into a formal anti-trust complaint.[740] ICOM is largely funded by Microsoft, its sole trustee. In 2007, the *Wall Street Journal* and the *Observer* both revealed stories about Microsoft's cozy relationship with ICOM.[741]

In addition, *Ciao!*, once a long-time Google AdSense partner, now is owned by Microsoft. Initially *Ciao!* took its case to the German competition authority, but moved its case to the EC to have legal standing throughout Europe rather than limiting its case to Germany. In March 2011, Microsoft itself filed a formal complaint with the EC, stating that Google had engaged in an unfair, anti-competitive "pattern of actions."[742]

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[739] Gregg Keizer, "Microsoft not fooling anyone by using FairSearch front in antitrust complaint against Google," *Computer World,* April 9, 2013, http://www.computerworld.com/article/2496436/technology-law-regulation/microsoft-not-fooling-anyone-by-using-fairsearch-front-in-antitrust-compla.html.
[740] Richard Waters and Nikki Tait, "Microsoft in spotlight over Google case," *Financial Times*, March 4, 2010, http://www.ft.com/intl/cms/s/2/ad1c2094-27bf-11df-863d-00144feabdc0.html#axzz3GcufcYWl.
[741] Milo Yiannopoulos, "Dark forces gunning for Google," *Telegraph,* December 6, 2010, http://www.telegraph.co.uk/technology/8184065/Dark-forces-gunning-for-Google.html.
[742] Bill Rigby and Foo Yun Chee, "Microsoft files EU competition complaint vs. Google," *Reuters,* March 31, 2011, http://www.reuters.com/article/2011/03/31/us-microsoft-google-idUSTRE72U1IN20110331.

TripAdvisor, a travel review Website, also joined the EU competition complaints against Google. TripAdvisor, along with Microsoft, is one of the founding members of FairSearch. The 17-member group was created after Google had acquired flight-booking software ITA in 2010. Members of FairSearch also include other major US-based Google competitors – Foundem, Expedia, Hotwire, Kayak, Nokia (now own by Microsoft), Oracle etc.

Joaquín Almunia, the EU competition Commissioner, had already hinted in the summer of 2012 that Google and the Commission had "substantially reduced" their differences.[743] Mr. Almunia had been suggesting that he would like to negotiate with Google rather than deal with them in court.[744] In April 2013, the Commission concluded that Google may have breached antitrust rules and the Commission could fine the company as much as 10 percent of its annual worldwide revenue;[745] yet, the commission accepted Google's concession as Google submitted a proposal to address the concerns voiced by the European Commission. The Commission invited comments from interested parties on Google's offer in relation to online search and search advertising.[746] Microsoft led Google's rivals in pressuring the commission to reject Google's proposal, which promised to label Google's own services and show links to rival services in its search results. "It would be better to do nothing than to accept Google's proposals," said

[743] Matt Warman, "EU: Google antitrust case not affected by US FTC ruling," *Telegraph*, January 4, 2013, http://www.telegraph.co.uk/technology/google/9780957/EU-Google-antitrust-case-not-affected-by-US-FTC-ruling.html.
[744] Charles Arthur, "Google offers concessions to European commission," *Guardian*, April 11, 2013, http://www.guardian.co.uk/technology/2013/apr/12/google-offers-concessions-european-commission.
[745] John Ribeiro, "EU tells Google to make more concessions or face charges in antitrust dispute," *PCWorld*, September 23, 2014, http://www.pcworld.com/article/2687212/eu-tells-google-to-make-more-concessions-or-face-charges-in-antitrust-dispute.html.
[746] "Antitrust: Commission seeks feedback on commitments offered by Google to address competition concerns," April 25, 2013, http://europa.eu/rapid/press-release_IP-13-371_en.htm.

Thomas Vinje of FairSearch. He further stated, "The proposals would make things worse rather than better."[747] Under pressure from Microsoft's lobbying groups, the EU made Google agree to further concessions to settle the case. In February of 2014, Google agreed to alter the way its search results display competitors' links, seemingly putting to an end the three-year antitrust probe and avoiding a heavy fine for Google.

Yet, the agreement was highly criticized initially from Microsoft-backed lobbying groups, which are asking for an actual test of Google's latest proposal before implementation.[748] This time, European digital capital backed by firms like Lagardère Active in France and Axel Springer in Germany are also heavily voicing their opposition to Google's proposed settlement with the EU. After many complaints and pressure from Google's rivals in both US and Europe, in June of 2014, Commissioner Almunia alluded that investigation on Google could be reopened and finally the EU Commission rejected Google's third proposed draft. Moreover, before the EC even settled Google's antitrust cases, FairSearch members including Microsoft, Nokia – a Microsoft partner in the mobile market – and Oracle, filed another separate antitrust complaint with the EC, claiming that Google had abused Android's market dominance in the smartphone platform to promote its own smartphone applications.[749]

Yet, by no means is Google merely on the defensive in its European antitrust cases. Google has the most extensive lobbying operations in Brussels and major

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[747] "Google rivals seek tough EU antitrust action," *Newsday*, June 25, 2013, http://www.newsday.com/business/google-rivals-seek-tough-eu-antitrust-action-1.5568236.
[748] Gregg Keizer, "Microsoft-backed lobbying groups blast talk of Google-EU deal," *Computer World,* January 29, 2014, http://www.computerworld.com/s/article/9245858/Microsoft_backed_lobbying_groups_blast_talk_of_Google_EU_deal.
[749] Gregg Keizer, "Microsoft not fooling anyone by using FairSearch front in antitrust complaint against Google," *Computer World*, April 9, 2013, http://www.computerworld.com/s/article/9238267/Microsoft_not_fooling_anyone_by_using_FairSearch_front_in_antitrust_complaint_against_Google.

European capitals and its business operations in Europe have massively expanded over the years. According to *Der Spiegel*, Google has been building its lobbying network of PR professionals, activists, and academics.[750] Google hired Antoine Aubert, who had previously worked for the EC for three years, as the head of Google's Brussels policy team.[751] In 2012, the company opened a Berlin office in Unter den Linden, the mecca for lobbyists. According to *Der Spiegel*, Google has 7 lobbyists in its Berlin office, and supports research institutes, interest groups and relevant conferences to influence Internet policy.[752] The newspaper noted that a former Google lobbyist now works for the German Foreign Ministry where he co-organized a conference along with Aarhus University, Human Rights Watch, and Humboldt Institute for Internet and Society under the theme of "Internet and Human Rights."[753] This is one of Google's more artful tactics as the company attempts to mobilize activists, academics, and government officials under the twin virtues of "human rights" and "Internet freedom" to which few would object; yet, this is an attempt to shield its corporate interests. Moreover, Google is not lobbying and intervening merely in its antitrust investigation cases, it has been attempting to influence policy in a range of areas including Intellectual property, privacy, 'net neutrality, censorship, trade, data security, and cybersecurity.

Along with its massive lobbying activities, Google is wooing European countries with the promise of creating IT jobs during a time of huge European-wide economic

[750] Sven Becker, "Google's Lobby Offensive: Internet Giant Builds Web of Influence in Berlin," *Spiegel Online International*, September 25, 2013, http://www.spiegel.de/international/business/how-google-lobbies-german-government-over-internet-regulation-a-857654.html.
[751] Bobble Johnson, "A brief guide to tech lobbyists in Europe," *Gigaom*, January 13, 2013, http://gigaom.com/2013/01/28/a-brief-guide-to-tech-lobbyists-in-europe/.
[752] Becker, "Google's Lobby Offensive."
[753] Ibid

downturn. In 2011, Eric Schmidt held out a carrot of 1000 new Google jobs in Europe[754] and boasted about supporting 20,000 European entrepreneurs in 2013.[755] Google, along with Microsoft, HP, SAP, Telefonia, and CISCO all joined the *Grand Coalition for Digital Jobs* launched by the EC to reorganize the European workforce centered around IT through a range of initiatives as European countries are restructuring their economies based on information technologies.[756] Eric Schmidt is also one of 16 members of the UK Minister's Business Advisory Group, which consists of a small group of people from strategic industries that offer business and economic advice to the Prime Minister.[757] By asserting its place within the European economic agenda, Google is weaving itself into Europe's economic development and trying to make itself indispensable. David C. Drummond, Google's chief legal officer, once said, "We're really trying to work with folks in Europe to establish ourselves as more of a local player."[758] Again an attempt to woo elite classes and ease antagonistic feeling against Google, in July of 2014, Google launched a new $100 million venture fund in Europe and noted "Our goal is simple: we want to invest in the best ideas from the best European entrepreneurs, and help them bring those ideas to life." Eric Schmidt also more recently went on a "grand tour of Europe" with Google's Advisory Council on the Right to be Forgotten – which consists

[754] John Kennedy, "Google plans 1,000 new jobs for Europe," *Silicon Republic*, January 25, 2011, http://www.siliconrepublic.com/careers/item/20096-google-plans-1-000-new-jobs.
[755] "Out commitment to growth and jobs in Europe," *Google Europe Blog*, June 13, 2013, http://googlepolicyeurope.blogspot.ro/2013/06/our-commitment-to-growth-and-jobs-in.html.
[756] "EU acts to fill 900,000 ICT vacancies predicted for 2015 – Minister Bruton," *Tech Central*, March 4, 2013, http://www.techcentral.ie/eu-acts-to-fill-900000-ict-vacancies-predicted-for-2015/.
[757] "Business Advisory Group," https://www.gov.uk/government/news/business-advisory-group.
[758] Ben Rooney, "Google Searches for Niche Role in Europe," *Wall Street Journal*, January 23, 2013, http://online.wsj.com/article/SB10001424052970204301404577172673564180532.html.

largely of European politicians, academics, lawyers, and other elites who had previously worked on privacy policy in the EU – in order to influence EU's data policies.[759]

The inter-capitalist battles over the European market are far from settled, as the information market continues to be disrupted and reorganized around the Internet; this will no doubt intensify as lobbying efforts remain in high gear. Along with its continuing antitrust case, Google has already been hit with a fresh EU antitrust complaint. This time, at issue is its Android OS licensing. According to the *Financial Times*, Google is being investigated by European regulators about allegations including licensing Android below cost to mobile device makers and requesting that they install Google mobile services.[760] For Google, this will surely not be the last complaint.

The question is then what role will the European states play? States are not neutral entities. Up until recently, the EU had remained relatively favorable in its dealings toward Google; Google was able to escape from major legal action. However, Edward Snowden's exposure of the US National Security Agency (NSA) and its secret global surveillance programs has complicated the relationship between European capitals, the US and other States, and political constituencies given the scale of US surveillance activities and the fact that the NSA directly collected data from servers of major Internet firms like Microsoft, Google, Apple, Yahoo!, and others. Despite Google's vehement denial of its collaboration with the NSA, there have been several reports on Google's collaboration with and close ties to the NSA. According to the *UK Guardian*, the US government even threatened to fine Yahoo! $250,000 a day for not complying with NSA

[759] Julia Powles, "Google's grand European tour aims to map out the future of data ethics," *Guardian,* September 10, 2014, http://www.theguardian.com/technology/2014/sep/10/google-europe-explain-right-forgotten-eric-schmidt-article-29; "Google Advisory Council," https://www.google.com/advisorycouncil/.
[760] Daniel Thomas, "Google faces Brussels probe over Android licensing," *Financial Times,* June 13, 2013, http://www.ft.com/intl/cms/s/0/b3da6604-d42b-11e2-8639-00144feab7de.html#axzz2WB6ddJ4y.

demands for PRISM data.[761] While Google and other Internet firms immediately condemned the NSA's actions, they are facing serious challenges in their overseas markets.

After the NSA news broke, Google quickly began to turn up its PR machine as Google and other US Internet firms recognized that NSA's Prism program would cost their businesses that heavily rely on international markets – announcing that the company encrypts email against NSA snooping. Yahoo! also teamed up with Google to work on email encryption. IBM is spending a billion dollars to build a data center outside the US to assure its international clients that their data are safe from US government surveillance.[762] Microsoft is now offering foreign customers the option of storing their data on servers outside US.[763] In a *New York Times* interview, Daniel Castro, a senior analyst at the Information Technology and Innovation Foundation, estimated that US cloud computing industry has a potential to lose $35 billion by 2016, and Forrester Research, a technology research firm, anticipated the losses could be as high as $180 billion or 25 percent of industry revenue.[764]

There are strong signs that European- and other states are stepping up attempts to control information flows and network infrastructures. In February of 2014, the European Union and Brazil announced that they were building their own undersea cable to bypass

[761]Dominic Rushe, "Yahoo $250,000 daily fine over NSA data refusal was set to double every week," *Guardian*, http://www.theguardian.com/world/2014/sep/11/yahoo-nsa-lawsuit-documents-fine-user-data-refusal.
[762] Claire Miller, "Revelations of N.S.A. Spying Cost U.S. Tech Companies," *New York Times*, March 21, 2014, http://www.nytimes.com/2014/03/22/business/fallout-from-snowden-hurting-bottom-line-of-tech-companies.html?_r=0.
[763] James Fontanella-Khan, "Microsoft to shield foreign users' data," *Financial Times,* January 22, 2014, http://www.ft.com/intl/cms/s/0/e14ddf70-8390-11e3-aa65-00144feab7de.html?siteedition=intl#ixzz2r9yJN1Qz.
[764] Miller, "Revelation of N.S.A, spying Cost U.S. Tech companies"; James Staten, "The Cost of PRISM Will Be Larger Than ITIF Projects, *Forrester*, August 14, 2013, http://blogs.forrester.com/james_staten/13-08-14-the_cost_of_prism_will_be_larger_than_itif_projects.

US undersea cables, which are used by Brazil to communicate with Europe. The project will be executed by Brazilian telecom provider Telebras and Spain's IslaLink Submarine Cables. And German Chancellor Angela Merkel, backed by French President Hollande, also called for the creation of a European centered Internet network to avoid US Internet infrastructure. Chancellor Merkel said,

> We'll talk about European providers that offer security for our citizens, so that one shouldn't have to send emails and other information across the Atlantic. Rather, one could build up a communication network inside Europe.

In response to the German and French proposal on an EU-centric communication system, the US Trade Representative (USTR) immediately struck back and criticized the plan as a violation of trade laws, stating "to create national-only electronic networks could potentially lead to effective exclusion or discrimination against foreign service suppliers that are directly offering network services, or dependent on them."[765] The USTR also denounced the Canadian government's building of a unified email system requiring data to be stored in Canada and preventing US companies from bidding. Bell Canada was awarded the contract.

As European states challenge the US to control their own information systems in the wake of the Snowden revelations, this opens momentum for European capital to push their business interests. Mathias Döpfner, chief executive of Axel Springer, Europe's biggest newspaper publisher, wrote a scathing open letter titled "We are afraid of Google" to Eric Schmidt in the Springer-owned *Frankfurter Allgemeine Zeitung* newspaper. In the letter, he depicted the power of Google as a digital super state:

> Google is to the Internet what the Deutsche Post was to mail delivery or Deutsche Telekom to telephone calls. In those days there were national state monopolies.

[765] "Merkel and Hollande to discuss European communication network avoiding US," *Reuters,* February 15, 2014, http://af.reuters.com/article/worldNews/idAFBREA1E0IE20140215.

> Today there is a global network monopoly. This is why it is of paramount importance that there be transparent and fair criteria for Google's search results.[766]

European capital is being mobilized and is pressuring EU regulators to restrain Google's market power. Deutsche Telekom has proposed a law against European data being routed through Asia or the US, and disbanding the Safe Harbor agreement, which allows access to European data to US companies with European-level privacy standards.[767] A Group called the "Open Internet Project" – backed by Axel Springer, the leading French mobile media group *Internet Lagardère Active*, and 400 European digital companies – lobbied the European Commission to revisit its decision on the Google settlement.[768] Thirty European publishers from the European Association of Newspapers also urged the EU to reject Google's latest proposal to settle an antitrust case.[769] This time European capital has political clout, and European politicians are starting to shift their positions on Google. Arnaud Montebourg, France's Economy Minister, compared Google to "a new East India Company" seeking to ravage European wealth.[770] German Economy Minister Sigmar Gabriel even called for breaking up Google's monopoly, and to "re-establish the sovereignty of law by ruling that Google can no longer simply bypass European

[766] Mathias Döpfner, "An open letter to Eric Schmidt from Mathias Döpfner," April 17, 2014, https://www.axelspringer.de/dl/433625/LetterMathiasDoepfnerEricSchmidt.pdf.
[767] "U.S. knocks plans for European communication network," *Reuters*, April 4, 2014, http://www.reuters.com/article/2014/04/04/us-usa-trade-telecomunications-idUSBREA331W820140404.
[768] Jeevan Vasagar, "The news baron battling Google," *Financial Times*, June 9, 2014, http://www.ft.com/intl/cms/s/0/beb7aeae-eb3d-11e3-bab6-00144feabdc0.html#axzz3BLT1fsMn.
[769] Loek Essers, "Publishers urge European Commission to reject Google antitrust deal," *PC World*, September 4, 2014, http://www.pcworld.com/article/2602600/publishers-urge-european-commission-to-reject-google-antitrust-deal.html.
[770] Alex Barker, James Fontanella-Khan and Jeevan Vasagar, "Google feels political wind shift against it in Europe," *Financial Times*, March 21, 2014, http://www.ft.com/intl/cms/s/2/7848572e-e0c1-11e3-a934-00144feabdc0.html#axzz3Aic8kphy.

standards."[771] The EU's incoming digital policy chief Gunther Oettinger signaled that Google market power could be constrained, and that the EU needs to boost European information industry and prioritize the industry.[772]

In January 2014, at the World Economic Forum in Davos, the Lisbon Council, a Brussels-based think tank, and Nesta (formerly NESTA, National Endowment for Science, Technology and the Arts) the UK's innovation foundation, partnered with the European Digital Forum funded by European Investment Fund, Telefónica, Banco Bilbao Vizcaya Argentaria (BBVA), Orange, and the European Commission to promote European capital centered digital economy. Neelie Kroes, vice-president of the European Commission, said as she introduced the Digital Forum at Davos, "Europe needs thriving startups and global internet companies to become a global growth centre again." There remain open questions: would it be possible for Europe to build and sustain its regional information-led economy that could insert Europe into US-centered information systems that are deeply saturated within transnationalized digital capitalism? Can European nation states and capital build a unifying political force and set aside their conflicting interests? And how does Europe negotiate between European interests and the overarching interests of transnational capitalism?

The Chinese and European cases of search engine industry illustrate the instability of current US-centered global Internet economy and information systems as US digital capital is far from ruling the global search market outright. There has been increasing

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[771] Jeevan Vasagar, Richard Waters and James Fontanella-Khan, "Europe Strikes back," *Financial Times,* September 15, 2014, http://www.ft.com/intl/cms/s/0/37e363c2-3cc9-11e4-871d-00144feabdc0.html#axzz3GFQYly7h.

[772] Alex Barker, Duncan Robinson, and Murad Ahmed, "New EU digital chief puts Google on notice," *Financial Times*, September 10, 2013, http://www.ft.com/intl/cms/s/0/a97527e2-3903-11e4-9cce-00144feabdc0.html?siteedition=intl#axzz3FoxvVNnb.

resistance against Google's dominance on the Internet; however, the nature of this strong oppositional movement against US Internet firms and the US state is not a revival of the New Information and Communication Order (NICO) aiming to reestablish self-determination and to create a just world. Rather, these conflict zones reveal the intensification of inter-capitalist competitions over a new site of capital accumulation – the global information domain, and states have not been standing on the sidelines. As Schiller posits, "the force field of transnational capitalism was not constituted as a neutral political space."[773] It is certain that the new geopolitical landscape and political economy dynamics will further disrupt US-led transnational digital capitalism.

[773] Dan Schiller *Digital depression: information technology and economic crisis* (Urbana, Chicago: University of Illinois Press, 2014), 238.

Conclusion

Whether in libraries, educational and other cultural institutions or in corporate boardrooms, the conventional view is that the new technical capability to access information has intrinsically good and democratic value. It's as if access to and distribution of information in and of themselves will deliver a more democratic and egalitarian global society.

However, by looking at the political economy of search, this study challenges that conventional notion. It uncovers capital's process of organizing the search industry in response to the commercialization of the Internet and in order to cultivate new territories of profit. The study demonstrates how the technical capability of search on the Internet is hard-wired into the center of global economic activity and how digital capital has established search businesses to reshape the information economy at large.

Annexation and reconfiguration

Searching is a basic human activity, ubiquitous in everyday people's social lives. This domain of information searching used to be either informal or contained within the public sphere, where it was managed by non-market entities like libraries and other cultural and educational institutions. Capital has consistently tried to pry open and reorganize those institutions into commercial zones. However, entrenched practices such as public information provision by libraries and cultural institutions, fair use and mostly free access to government information[774] remain bulwarks against commercial forces.

[774] For issues surrounding access to government information and libraries, see the blog *Free Government Information*. http://freegovinfo.info.

At the outset of the early 1990s, search activities were taking place through a mixture of non-market- and market information outlets. The development of the search function with Internet connectivity seemed even to open up new possibilities to access and organize information, and to bring back the pieces of the information domain that had moved to the market back into the public sphere. New technical capability for access and distribution of information and the lack of a market-based model over the Internet offered opportunities for cultural institutions to expand their influence in shaping information provision in general for the public good.

However, despite its democratic potential and wondrous technical affordances, the search function has instead been reorganized by digital capital, and turned into a new industry. The search engine industry is ravaging through the public information commons, opening up new profit sites and engulfing the remaining non-market information domains, and has become the leading edge of the information economy. Over the last 10 years, everyday people's information activities have massively migrated away from a patchwork of libraries, yellow pages, newspapers, magazines, community, friends, family, acquaintances to the transnational Internet based information retrieval system. This shift has spurred new practices of social and cultural life expressed in terms of efficiency, democracy and technological breakthroughs; yet it is far removed from democratic information provision.

As demonstrated earlier, search technologies did not have inherent economic value nor did digital capital have any preconceived long-term business plan to monetize search function. As Robert Brenner agues, capitalist production is unplanned and

uncoordinated but has an inherently competitive nature.[775] Under state policies that encourage capital to carefully structure the Internet into new economic growth zones, capital's persistent attempts to further commodify and commercialize information over the Internet have engendered the development of search as a profit-making information service. Today search expands its markets across the Internet economy as it weaves into every information sector and beyond. By annexing public information provision, and reconfiguring existing information- and industrial sectors into its profit domain and controlling information infrastructure, digital capital has a stranglehold on the information space and has turned search into a large-scale global industry based on untold quantities of uncompensated labor.

Labor and Class Relations

The large-scale industrial size of search business under competitive market pressure impels efforts to establish distinctive labor processes to maximize profitability. On the surface, the search engine industry seems to offer a promise of capitalism that can be built on a new mode of production and new social relations that are not based on capitalist exploitation of labor. And if the dominant public rhetoric turns out to be true, then the industry is supposed to be a new economic engine that produces a large pool of *highly skilled* wage earners, eliminates low-waged jobs and leads to prosperity for all. Yet, instead, the structural change occurring now is engendering a new growth of inequality.

The labor structure of the search engine industry is extremely polarized, with a hierarchical division of labor – a small number of skilled and highly paid cadre of

[775] Robert Brenner, *The Economics of Global Turbulence: The Advanced Capitalist Economies From Long Boom to Long Downturn, 1945-2005* (London: Verso, 2006), 7.

workers at the top with a mass of low- and unwaged labor at the bottom. This indicates that the highly automated search industry's generation of profit and wealth does not hinge on a high percentage of skilled workers, rather it leans heavily on the exploitation of invisible low-waged processing labor, and on appropriation of a massive amount of unwaged labor. Throughout this historical process, digital capital has enlarged and reorganized a low-waged global working class, and related to an unprecedented extent on unwaged labor to integrate it into its profit-making project.

Interestingly, this exploitative labor structure is mostly concealed from the public, and worse, search giant Google has been portrayed as defying its capital logic by empowering workers and seemingly relinquishing capital's control over labor. In the era of austerity when many workers are willing to accept wage cuts to hang on to their jobs and are struggling for their survival, Google has been perceived as going against the grain in offering a system in which capitalism is compatible with democratic ideals. However, Google's relation between labor and capital firmly allies with its corporate accumulation strategies by artfully applying the welfare capitalism management techniques of the industrial era and combining it with a façade of "objective" science and data to bring both waged and unwaged labor under Google's corporate control. Google's worker-centered corporate management strategies are not signs of altering capitalist social relations, but alliances within an elite class, and its "user-centered" approach has become both the basis of Google's global surveillance-based search business, and the global infrastructure of information control.

Geopolitics

This newly emerged search engine industry plays a pivotal role in transnational capitalist economy as it builds extraterritorial information networks to circulate an array of new information commodities, services and culture over an extraterritorial network – the Internet. US-based firms, and in particular Google, are impressively exploiting and capturing the global Internet space. However, their superiority over the Internet recasts the strategic political and economic importance of information flows and information networks, which reignite political conflict among major global powers maneuvering between domestic interests, capitals and rival social forces. The case of the search engine industry illustrates the volatility of US-dominated global information systems and the challenges against a historically long standing US information regime that are mounting, with structural changes to the political economy and both new and old geopolitical rivalries – including China's reentry into the global capitalist system, and Europe's renewed efforts to control its information infrastructure which are rapidly altering the dynamics of the geopolitics of information.

The study shows that foreign transnational capital, and in particular US capital, heavily fuels the building process of Internet sectors in China, and China's Internet sector is at the center of a reconstituting global digital capitalism. As part of Chinese State policy – if not benign neglect by the Chinese state – foreign capital has been drawn into building domestic Internet sectors that are linked into the global transnationalized capitalist system. Given the significant role of foreign capital in Chinese Internet sectors, PRC has no intention to cut off foreign capital for fear that it will jeopardize both domestic as well as foreign capital. Its silence on foreign capital in China's strategic

sectors like the Internet is an intentional act on behalf of transnational political economy. On the US side, the US state and US capital will not abandon China's high growth Internet market. And the contention between China and US is neither US's effort to mobilize the democratic movement in China by offering new information technologies nor China's attempt to challenge the US model of capitalism. Rather, the conflicts between China and the US are not over whether capitalist development should structure and guide the information sector – or any other sector – but about the terms on which this development will proceed. Which companies and which states will dominate and appropriate the greatest share of the profits that result?

There is no doubt that these battles in the fastest growing markets will continue between US- and China-based transnational capital, but this might reach a point of rearrangement between the two countries. It has already begun to move in that direction. At the US-China Internet Industry Forum hosted by Chinese and US Internet firms, the US has been asking China for cooperation in the areas of Internet governance, Internet freedom and intellectual property. Robert D. Hormats, Under Secretary for Economic Growth, Energy, and the Environment, speaking at the 2013 Forum stated:

> I want to stress that collaboration with the private sector – both in China and the United States – will be critical to progress in each of these areas … We desire cooperation, not confrontation, because we believe that business and scientific collaboration between our two countries and among all countries can be mutually beneficial.[776]

On the European side, the battle between Google and the EU over cyberspace unveils the intensification of inter-capitalist rivalries among US capital over the European information market as well as the changing political climate in Europe that once again is

[776] U.S. Department of State, "Remark by Robert D. Hormats at U.S.- China Internet Industry Forum," April 6, 2013, http://www.state.gov/e/rls/rmk/207490.htm.

challenging US-centered transnational information economy. Google's domestic rivals aligned with European digital capital are fighting against Google's monopoly of the most lucrative information sectors, attempting to carve out their own market share. Meanwhile, Western European states and capital have been searching for European alternatives to Google, led mostly by France, but up until recently they had no political or economic front from which to challenge US digital capital. Yet, the political pressure in Europe is shifting to control over its information economy and information networks, facing sluggish economic outlook and Edward Snowden's revelations of the far-reaching US surveillance program that transgresses national sovereignty. Especially after the revelations on NSA surveillance programs which struck a chord, public opinion across Europe and other parts of the world has shifted against US digital capital, and US's closest ally Germany is even calling for European-centered information infrastructure to bypass US-controlled information flows. European governments are pushing to reform EU data protection regulations. European Court of Justice (ECJ) already required for Google and other search engines to comply with the EU's "right to be forgotten" rule in which EU citizens have the right to request information online be removed from search results when the information is inaccurate. Spain passed a new copyright law that imposes fees for online content aggregators like Google to protect its domestic media industry – the so-called "Google Tax."[777] Germany's Günther Oettinger, incoming European Commissioner for the Digital Economy, is strongly signaling the possibility of imposing an EU-wide "Google-tax."[778] And, European capital is taking advantage of this

[777] Alex Hern, "Spain moves to protect domestic media with new 'Google tax'," *Guardian*, October 31, 2014, http://www.theguardian.com/technology/2014/oct/31/spain-newspaper-google-tax.
[778] "Oettinger floats proposal for EU-wide 'Google-tax,'" *EurActiv*, October 29, 2014,

political momentum to pursue its corporate interests and trying to occupy a better position within global digital capital.

Of course, the US State and US digital capital are not going to take Europe's pushback sitting down. The US State is asserting political economic power to fight oppositional forces in order to maintain US position, but dealing with enormous political challenges. Google is also working on several fronts to align with European capital. It is participating in building a submarine cable between the US, Brazil, and Africa with Brazilian ISP Algar Telecom, Uruguayan incumbent telco Antel, and a consortium of Angolan ISPs.[779] More recently, Google showed its importance to the European information market. After it had been forced to remove German media company Axel Springer's content from displaying in Google search, Springer changed their stance, finding that search engine traffic to the Springer sites had dropped 40%.

The battle over the control of global information systems is far from over. The questions remain: will the US be able to deflect its challenges once again and retain its control over the information system? How and in what ways may states collaborate to privilege transnational as opposed to domestic capital and navigate domestic political and social interests? And how may states yet deal as the ground continues to shift under their feet?

Then the question for us is where is the hope for true democratic and emancipatory information provision when even the most basic functions of information access through search are being controlled and appropriated by capital? What are the

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http://www.euractiv.com/sections/innovation-enterprise/oettinger-floats-proposal-eu-wide-google-tax-309568.

[779] "Google building US-Brazil submarine cable with three partners," *Telegeography*, October 13, 2014, http://www.telegeography.com/products/commsupdate/articles/2014/10/13/google-building-us-brazil-submarine-cable-with-three-partners/.

possibilities to organize around a democratic information undertaking? The answer is not about using Google alternatives that are funded by other venture capital firms. It's not about choosing between Google vs. DuckDuckGo or merely implementing various privacy tools developed by the US State Department or corporations or negotiating with corporate power and capitalist states to tweak capitalism to be "gentler." Then where do we go from here?

There are signs of political hope in local, national and international arenas where collective actions are rejecting transnational corporate powers and capitalist development that dispossess, displace, and brutalize everyday people, and strip away public goods. There is little media coverage on this front, but in Mainland China, workers are resisting against China's market-oriented reforms that have led to violence against the poor, and demanding social and economic justice.[780] In Europe, anti-austerity movements are still alive across many countries from Spain and France to Ireland and Greece. Recently, tens of thousands of people in Spain, where unemployment has reached 29%, have rallied in the streets to oppose austerity measures imposed by capitalist states and transnational financial Institutions like the IMF. Workers at Amazon.com sites in Germany have been fighting against unfair wages, and have walked out on their jobs. Uber drivers are protesting against unjust working environment and increasing exploitation by the company, which profits from the supposed "sharing economy." Google's sub-contracted security guards are protesting against Google, Apple and other Internet firms in Silicon

[780] Yuezhi Zhao explains the recent Hong Kong protest and points out that western media focuses its protest coverage around liberal democratic framework while they are silent on workers' protests demanding social and economic justice. See "How Socialist China Became the Workshop of the World," *Real News*, October 13, 2014, http://therealnews.com/t2/index.php?option=com_content&task=view&id=31&Itemid=74&jumival=12515

Valley for unjust labor practices. Facebook bus drivers are fighting to organize a labor union. In San Francisco, where thousands of people have been displaced as digital capital has swept into the city and enriched a small class segment, people are building solidarity under the banner of housing justice to fight for the right to stay, live and build their own city.

Now we're at the point of dismantling the myth of information and information-based capitalist systems that persistently promise democracy and equality, but not only fail to deliver it but insidiously generate further inequality and injustice. We're at the point of collectively imagining and building information provision autonomous from capital.

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